TELEPHONY

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25 1940

VOLUME 118

MAY 25, 1940

NUMBER 21

XUM

An Appropriate Telephone For The Modern Farm Home

Modern, good-looking, efficient—Leich's No. 86 Magneto Handset is adequately representing the telephone industry in today's modernized farm homes. Its attractiveness and convenience enable it to effectively compete with the many electrical appliances offered for recently-wired residences. Its sturdy working parts are enclosed in a handsome all-bakelite case that compares favorably in appearance with the newest-styled electrical products. It is, in short, a 1940 magneto telephone that is pleasing all members of farm families and making friends among rural subscribers.

Technically, too, the No. 86 is far advanced over old-style magneto telephones. It has, for example, an anti-sidetone circuit which—in conjunction with Leich's proven handset transmitter and receiver—provides a quality of transmission that is wholly new to magneto service. The small, but extremely powerful, Alnico generator satisfactorily replaces all older types of three-, four- or five-bar generators. And lastly, but equally important, the No. 86 set is convertible and can be changed—easily and inexpensively—from a wall set to desk set when a desk or table type of installation is preferred.

Discover for yourself why hundreds of telephone companies are specifying this instrument for replacement of older sets and for all new magneto stations. A few trial installations will be highly revealing. Order as follows:

Cat. No.	*Description*	*Price, Each*
86-A-1000	1000 Ohm Ringer	$20.25
86-A-1600	1600 Ohm Ringer	20.40
86-A-2500	2500 Ohm Ringer	20.65

Prices F.O.B. Genoa, Illinois, and Subject to Change Without Notice.

LEICH SALES CORPORATION

427 W. RANDOLPH STREET., CHICAGO, ILLINOIS

TELEPHONY, May 25, 1940. Volume 118. No. 21. Published every week on Saturday by TELEPHONY PUBLISHING CORPORATION, 608 So. Dearborn St., Chicago, Ill. Telephone Wabash 8604. Subscription $3.00 per year. Entered as second class matter September 4, 1908, at the Post Office at Chicago, Ill., under the act of March 3.1879.

Reflecting

SUPERIOR ENGINEERING

In every detail of construction, the Stromberg-Carlson No. 1212 Handset reflects superior engineering—a superiority that creates good will for the operating company.

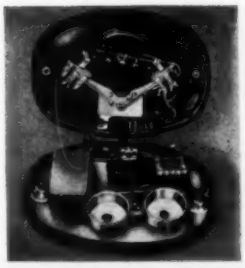
From the special Stromberg-Carlson receiver and transmitter to the hook switch and to the compact parts in the base of the instrument, the most advanced telephone engineering is evident. Coupled with this is a graceful design that fits into modern home and office decoration.

Order a test sample of the Stromberg-Carlson No. 1212 Handset. Inspect its construction in detail. Test it under your most exacting requirements, and you will see how this outstanding instrument will build more business for you.

STROMBERG-CARLSON TELEPHONE MANUFACTURING CO.
Factory & General Offices: 100 Carlson Road, Rochester, N. Y.
Branch Offices: Chicago, Kansas City, San Francisco, Toronto

The patented transmitter used with the Stromberg-Carlson No. 1212 Handset employs the cone-shaped diaphragm of the radio speaker. It moves as a rigid piston. Maximum flexibility is insured by annular corrugations near the outer edge.

Firm clamping of the diaphragm without excessive tension is insured at all times because the earcap's thread is entirely independent of the receiver's mounting thread. The result is a quality of reception that pleases subscribers.



Capacitor, ringer and induction coil are in the base of the instrument. More compact than previous parts, they provide even greater efficiency. Two-toned gongs mounted in the base provide a pleasant yet attention-compelling sound.

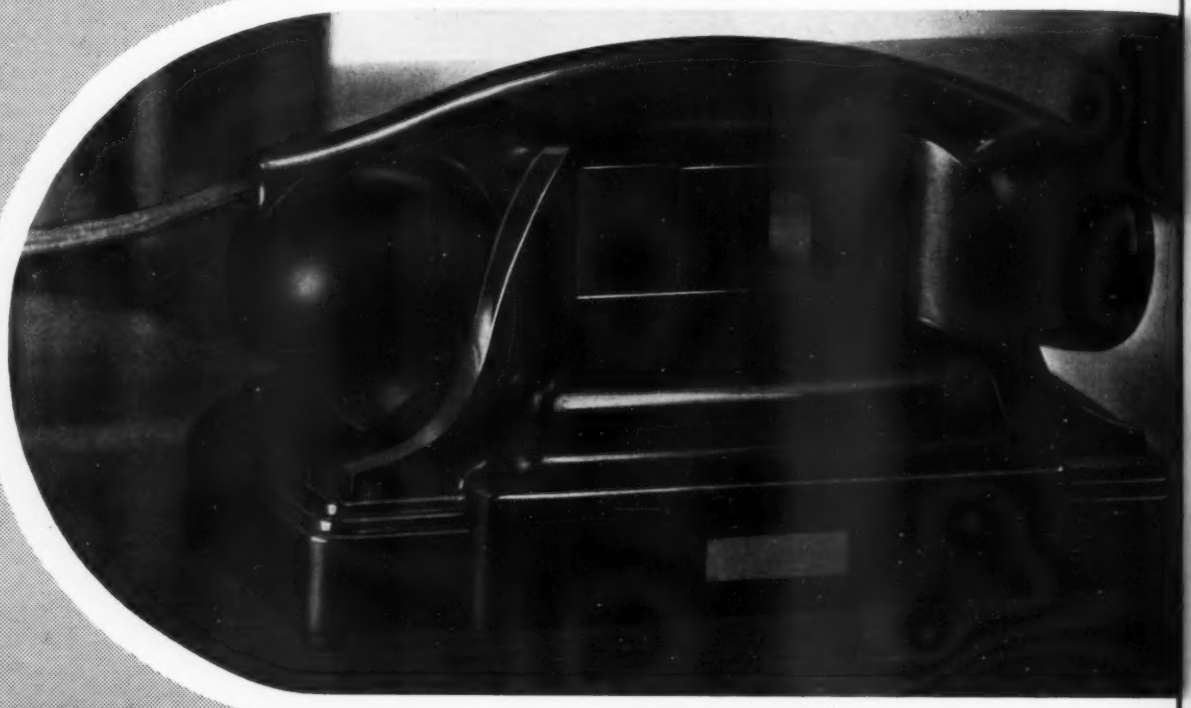
Stromberg-Carlson

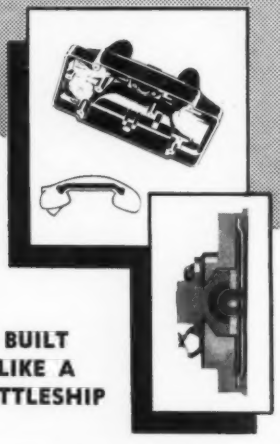
MAKERS OF VOICE TRANSMISSION AND VOICE

XUM

MASTER

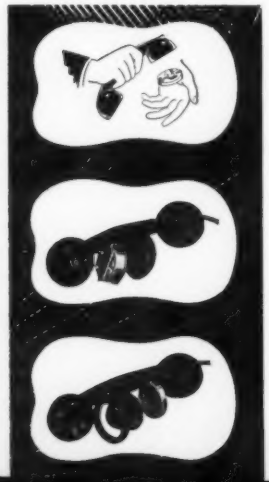
ARE YOURS





BUILT LIKE A BATTLESHIP

A glance inside the base tells the story. Here, molded of solid Bakelite, are extra supports, inserts and extra wall thicknesses. These reinforcements are provided at every possible point of strain. The handpiece diagram shows the heavy metal reinforcing bars, which are molded through the solid Bakelite center. These are the conductors which eliminate the usual hole through the handle and the nuisance of threading through the cords. A cross-section view of the famous NON-POSITIONAL transmitter typifies Kellogg rugged design and construction. This is the transmitter with that patented spherical electrode construction which set new standards for the industry.



There are no cord connections to these compact, self-contained, capsule type transmitter and receiver units—no screws or binding posts to worry about. Simply tapping the handpiece drops the capsules into your hand.

The Masterphone receiver is of the bi-polar type using a cobalt magnet for more magnetic saturation and longer life. Like the transmitter it always slides into the housing in the correct position. Locating lugs on the unit and guide slots in the housing wall do the trick. Receiver cap screws into, not over, the housing and is flush with the sides.

The Masterphone handpiece is simplicity itself. There is no hole through the handle to encourage breakage, no threading of cords. Heavy brass conductor bars, molded through the solid Bakelite center, add strength.

XUM

RPHONES

RSAFEST BUY ★ ★ ★

Giving You Standardization of Design, Interchangeable Parts and . . . . Protection from Obsolescence!

The whole Masterphone line is built upon a sound standardization structure. Because of this, it is the only line of modern telephones which permits you to establish a true standardization program within your exchange. These instruments not only protect you from obsolescence, but they also use the same interchangeable NON-POSITIONAL transmitters, receivers, handpieces, ringers, induction coils and resonance chambers. This eliminates any necessity for carrying a costly inventory of parts.

These things are important to any telephone company's program where a maximum return is required from a minimum investment. Kellogg stands alone as the only manufacturer with the complete answer to your telephone standardization problem.

AN ORDINARY SCREW-DRIVER

is the only tool required to remove or replace any Masterphone part. Maintenance, installation, inspection—all are but a matter of minutes. This saving in time and tools is another example of the many little extras which typify Kellogg products and which mean so much to you in extra value.

ONLY THE NEW MASTERPHONES HAVE ALL THESE DESIGN AND ENGINEERING FEATURES

1. MODERN, PRACTICAL STYLING.
2. SMALL, COMPACT SIZE.
3. DESK SET PORTABILITY—EASY TO PICK UP WITH ONE HAND.
4. SIMPLE, RUGGED CONSTRUCTION.
5. ALL BAKELITE EXTERIOR—NO EXPOSED METAL PARTS.
6. HANDLE REINFORCED BY TWO HEAVY BRONZE CONDUCTOR BARS MOLDED THRU THE CENTER.
7. KELLOGG STANDARD TRANSMISSION AND RECEPTION.
8. SELF-CONTAINED CAPSULE TYPE TRANSMITTER AND RECEIVER.
9. BRONZE CONTACT CLIPS ON TRANSMITTER AND RECEIVER UNITS WHICH ELIMINATE CORD TERMINALS.
10. EXCLUSIVE *NON-POSITIONAL* TRANSMITTER WITH PATENTED SPHERICALLY SHAPED CARBON CHAMBER
11. SIMPLE, RUGGED PLUNGER AND TRIGGER SWITCH.
12. LONG RESILIENT CONTACT SPRINGS—POSITIVE ACTION AND EASILY ADJUSTABLE.
13. EASY MAINTENANCE—NO SPECIAL TOOLS REQUIRED.
14. SMALLER, MORE EFFICIENT RINGERS.
15. SMALLER, EFFICIENT CONDENSERS—AND INDUCTOR COILS
16. RESONANCE CHAMBER AND NEW TYPE GONGS—GREATER CONCENTRATION AND PENETRATION OF RINGING TONE.
17. *TRIAD* CIRCUIT WHICH ELIMINATES SIDE TONE AND DISTORTION WITHOUT SACRIFICING VOLUME.

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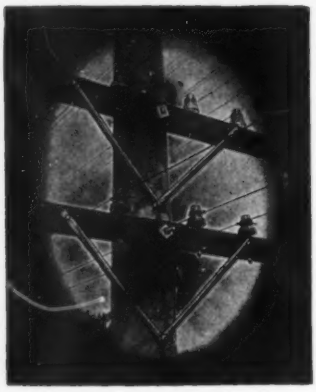

Joslyn

POLE LINE HARDWARE

Joslyn Pole Line Hardware stands up under the worst weather conditions. It is not affected by time—a coating of pure zinc protects it against rust and corrosion. Joslyn products are built to meet a standard—not a price. Complete stocks are carried at warehouses throughout the country to assure you fast, efficient service at any time, anywhere.

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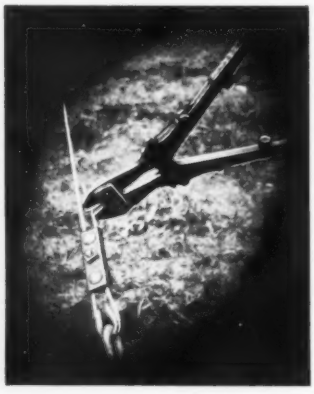
Crapo Galvanized Guy and Messenger Strand combines the strength and ruggedness of steel with dependable durability and ***low cost***. The dense, tightly adherent galvanized zinc coating, applied by the **Crapo** Process, provides lasting protection. ***Crapo Galvanized*** Telephone Wire is available in the new **Crapo** HTL-85 and **Crapo** HTL-135 High-tensile, Low-resistance Line Wires and in all other standard grades. Write for complete information!



Porter

STRAND CUTTERS

—for construction or repairs. They cut 16,000 and 25,000 lb. stranded guy-wires and all types of cable—and cut ***cleanly***, leaving no ragged edges or uncut strands. Just one of a complete line of durable, heavy duty Porter Cutters for cutting wire, cable, bolts, rods. There is a Porter Cutter exactly suited to every telephone company job. Write for catalog covering all cutting requirements.

Coffing "Safety-Pull"

RATCHET LEVER HOISTS

—meet every pulling requirement. For pulling guy wires, messengers, underground cables, pulling up poles, etc., Coffing "Safety-Pull" hoists are standard equipment with 86% of the power, light and telephone companies. They have demonstrated their reliability and have proved themselves to be the lightest, most powerful and most economical hoists on the market. Capacities ¾ to 15 tons. Weights from 14 to 150 lbs.

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CHICAGO

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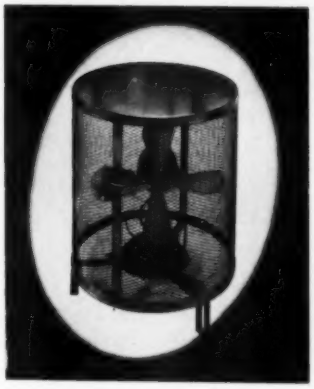
FAN GUARDS



Your operating rooms should be provided with air circulation below key-board levels. To insure absolute safety and maximum circulation, equip your fans with COPE Fan Guards and place them on the floor. Supplied in Dark Mahogany, baked enamel finish, for both 16" and 12" Fans, in Round Floor type and Flat Back Wall Type. Economical . . . Safety at low cost—write for prices.

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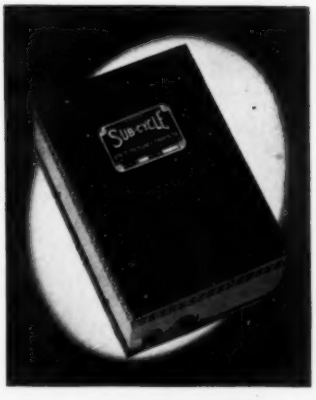
TOGGLE BOLTS

PACKAGED FOR CONVENIENCE AND ECONOMY . . . and now Paine's Spring Wing Toggle Bolts are packaged in units of 60 or 120 in assorted sizes of 10 to a carton . . . no more lost bolts, no more looking for the right size. This packaged assortment will meet all your requirements. Paine Toggle Bolts provide the sure, quick way to anchor telephones, ringer boxes, etc. All the holding power you need . . . easy to use . . . quick . . . and inexpensive.

Kester

ROSIN SOLDER

Solder-Protected joints eliminate high resistance points and intermittent open and closed circuits. To eliminate trouble, every joint should be soldered with Kester Solder. For years Kester Plastic Rosin-Filled Solder has been known as the most satisfactory product of its kind. To save time and money, and improve transmission, solder with Kester. Kester solder is available on 1, 5 and 20-pound spools.



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RINGING MACHINE

Lorain Products Corporation's Sub-Cycle Ringing Machine operates on A.C. and produces a powerful, uniform ringing current independent of frequency variations. Fool-proof; no moving parts; requires no routine maintenance. Low priced and thoroughly field tested, will give many years of dependable, economical ringing service. Also furnished with Pulsator. 5 Models to choose from with 20 to 50 watt outputs.

LINE SPLICES ARE ASSURED WHEN MADE WITH *Nicopress* TOOLS AND SLEEVES

. . . for once the sleeves have been compressed on the conductors with the compact, easily operated Nicopress Tool a splice is made that is so tight that the conductors will not pull out. And it also has a strength that equals or exceeds the rated breaking strength of the conductor. . . . This strength and tightness assures endurance and long life and lasting high conductivity.

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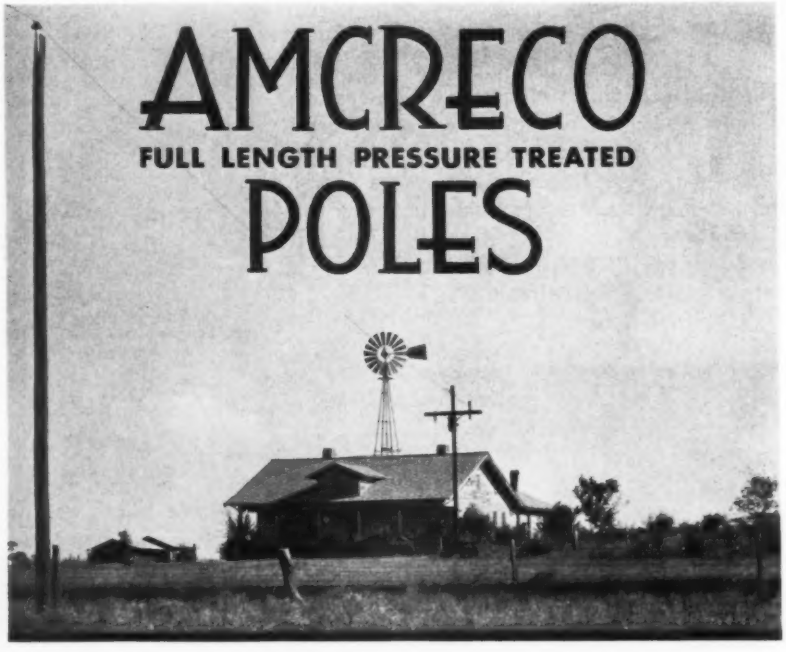
MAKE IT A NATIONAL *Nicopress* SPLICE

AMCRECO

FULL LENGTH PRESSURE TREATED

POLES



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Telephony

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GUARANTEED *in writing* TO DELIVER 6,000 HOURS OF SUSTAINED VOLTAGE AT PEAK TRANSMISSION EFFICIENCY

An "Eveready" "Air Cell" installation consists of 1 No. T-2600 and 1 No. T-1600

NATIONAL CARBON COMPANY, INC.

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GUARANTEES

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That is precisely what an "Eveready" "Air Cell" installation does!

It reduces the power cost of your Operators' Transmitters to ⅛ of a cent per talking or working hour... and because its voltage is sustained for 6,000 hours—at the proper level for peak transmission efficiency—improved quality of service results!

These guaranteed (in writing) batteries may be obtained from all principal telephone supply jobbers.

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HERE COMES
Quality Supplies
Profitable Operation
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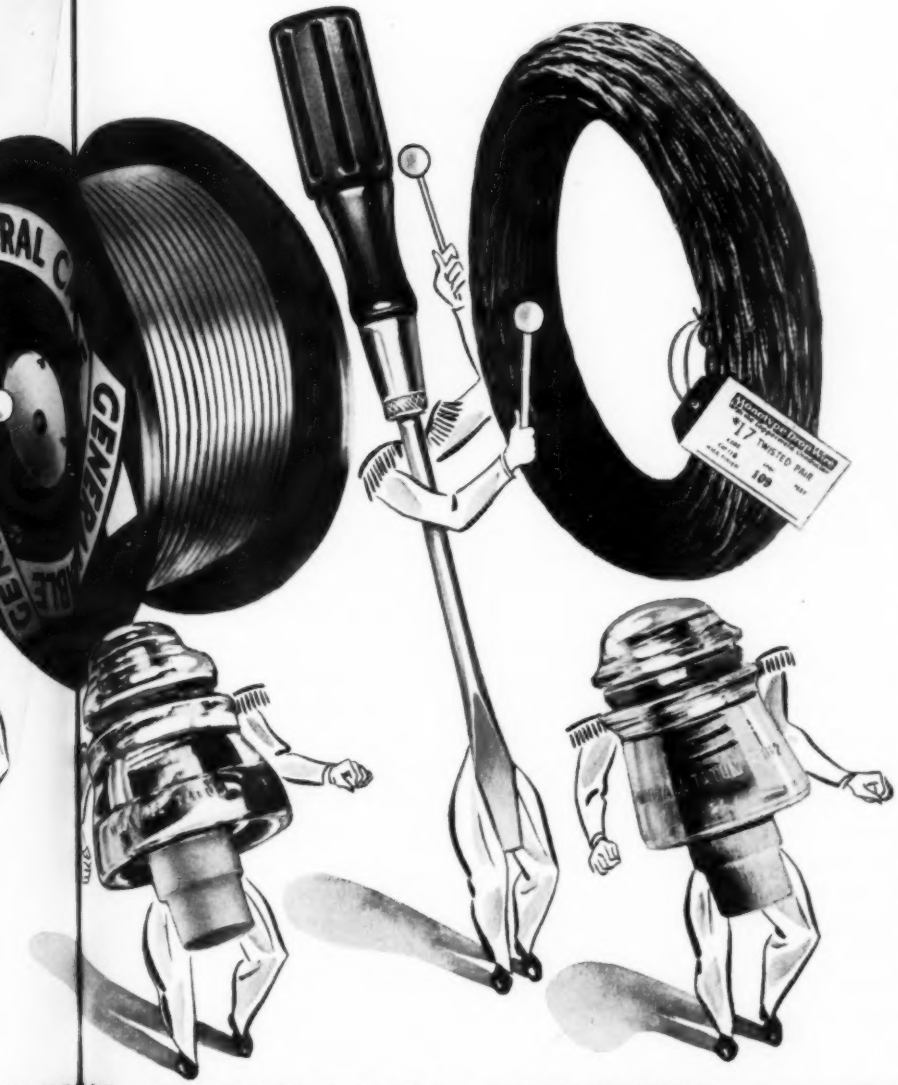
GENERAL CABLE
AMERICAN
MAKERS OF TELEPHONE SIGNALING

THE PARADE!

. . . of High Quality Supply Products to Aid Small Exchanges in their Fight for Profitable Operation



● To win the battle of better service, use this supply train for your front line army of construction and repairmen. They're out there every day fighting for you, but unless you furnish them with the best ammunition and supplies obtainable, you can't expect them to gain a lasting victory.

If you want truly top-notch performance—fast, accurate workmanship and jobs that "stay put" through storm and stress—see to it that your field men get American Automatic supplies to put up and American Automatic tools to put them up with. These typical trade names will tell you why: "Klein" pliers and safety belts, "Whitall Tatum" and "Hemingray" insulators, Monotype "Copperweld" drop wire, "Estwing" hammers and hatchets, "Hubbard" and "Line Material" pole line hardware, General Cable's "Standard Underground" cable, "Black Beauty" and "Taylor Colquitt" poles, etc., etc.

Why not get on the American Automatic band wagon today, and join the procession to long term economy and lasting satisfaction? A postcard request will bring our comprehensive supply catalog No. 5000, plus any other information on specific products you may desire. Write to us—today!

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TONE SIGNALING AND COMMUNICATION APPARATUS — ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

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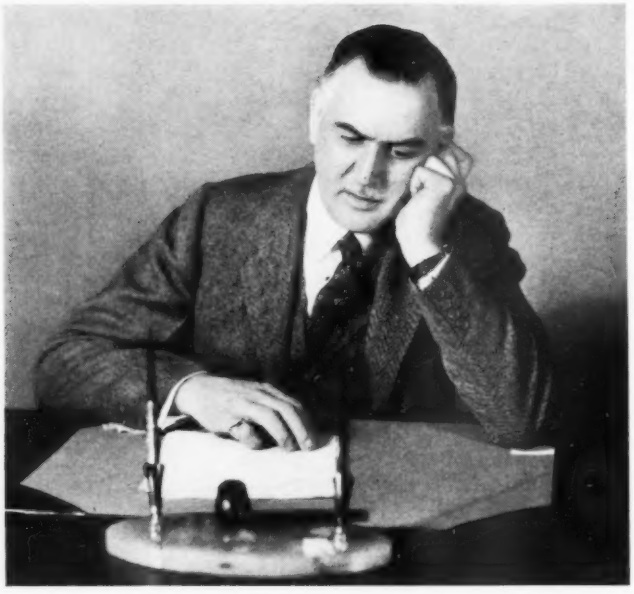
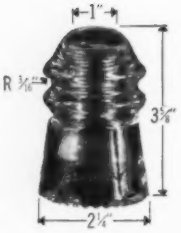
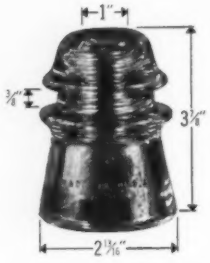
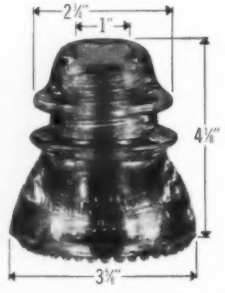




General purpose Hemingray Number 9. Has drip points on petticoat to accelerate moisture run-off.



Hemingray Number 16 has square groove to help insure that the wire will not slip down.



Hemingray Insulator Number 42, with its long leakage path keeps rural "toll" lines trouble-free.

How HEMINGRAY INSULATORS

Help with Your Tax Problems

THE tough part about taxes is that money must be found to pay them. One way to find the money is to reduce operating costs. In that, Hemingray Insulators *definitely* help.

Here's actual proof. A prominent utility company (name on request) reports "we have thousands of Hemingrays that have seen 50 years of active, continual service."

The secret of Hemingray long life lies, first, in the special glass "batch-mix" and second, in the unique Owens-Illinois straight-line production methods where each step in making Hemingrays double-checks the one before it. Result! Insulators free of voids, internal strains and stresses—so strong that they'll outlast your poles, hardware and crossarms. No matter what sudden changes of temperature, no matter how much rain, snow or sleet they encounter, their strength is unimpaired.

Reasonable in first cost and *always* sold through your nearby jobber—the man who lives with *your* needs through the years. In those rare cases where you must have data, etc., to meet "special" needs, please write Owens-Illinois, Hemingray Division, Muncie, Indiana.

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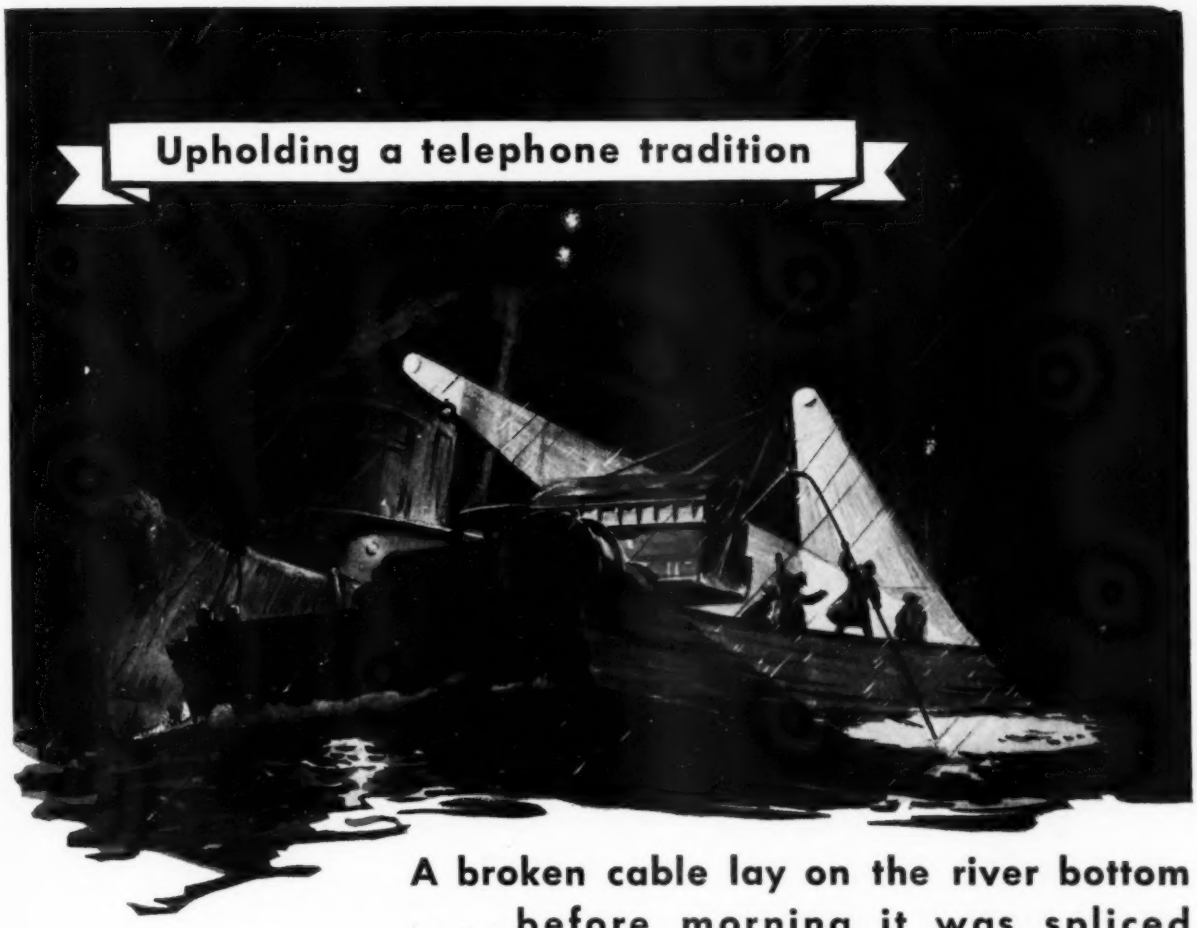

A broken cable lay on the river bottom . . . . before morning it was spliced

SNAP! went the cable after a ship's dragging anchor stretched it taut. Immediately, calls were switched to other lines and a repair crew with truck sent out by boat. Grappling hooks raised the broken ends of the cable . . . the splicing was completed and the cable returned to normal service overnight.

The vigilant resourcefulness of telephone men and women helps maintain the dependability that is a cherished telephone tradition. Helping them, in turn, is the faithful performance of the equipment on which they rely. For many years Exide Telephone Batteries have been part of this tradition.

Exides help at all times to maintain the highest standards of quick, clear service the country over. They stand ready to deliver dependable power in emergencies, and help to complete millions of calls a day with the same steady efficiency that enables the public to take telephone dependability for granted.

No matter what the type of service—common battery, emergency reserve, signal, or P.B.X., in small or large exchanges—you can rely on Exides to uphold the highest telephone traditions.

EXIDE BRANCH OFFICES

ATLANTA—210 Walker St., S. W.
BOSTON—100 Ashford St.
CHICAGO—4613 S. Western Ave. Blvd.
CINCINNATI—718-19 Temple Bar Bldg.
CLEVELAND—6400 Herman Ave., N. W.
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PHILADELPHIA—Allegheny Ave. and 19th St.
PITTSBURGH—1078 Union Trust Bldg.
ST. LOUIS—1218 Olive St.
SAN FRANCISCO—6150 Third St.
SEATTLE—1919 Smith Tower Bldg.
WASHINGTON—1619 L Street, N. W.

Exide

TELEPHONE BATTERIES

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Explaining Telephone Service to the Household Manager

●

The advertisement on the opposite page is one of a series appearing regularly in women's magazines. It talks to Mrs. America over the shoulder of the young man who bosses her household.

It reminds her of the many ways in which telephone service can lighten her burdens and provide more leisure hours. Good-humored advertising of this kind should benefit the entire telephone industry.

An Advertisement of the Bell Telephone System

XUM

HONEST INJUN? ***I don't believe it!***

It's true, Bobby! I've taken your Mother to the grocer and down to the dress-shops and cross-country to Aunt Barbara—all in twenty minutes!

It couldn't be so—Mother's been right here with me!

Of course she has! *I* did all that running around for her, so she wouldn't have to leave you. You see, I'm a telephone, and I can travel for miles and miles without even leaving this room. . . .

You must be foolin'!

It's *so*, Bobby—isn't it like magic? I carry messages and run errands, and yet I'm always *here* if you need anything.

Why, that's wonderful. Do you cost a lot of Daddy's money?

So little, Bobby, that Daddy says I'm downright *cheap*. In fact, he says I do so much, and cost so little, that he thinks of me as one of the family!

BELL TELEPHONE SYSTEM

XUM

IF IT'S A RECORD JOB

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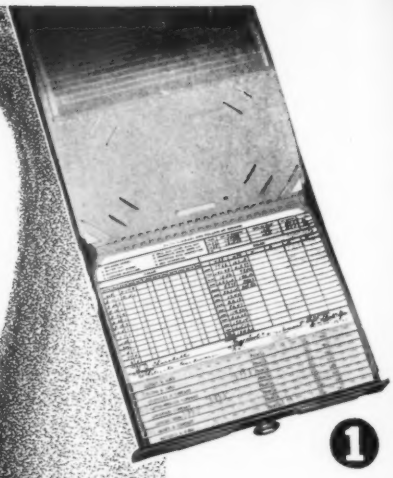

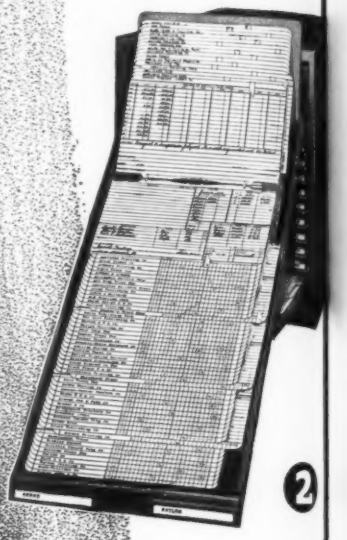

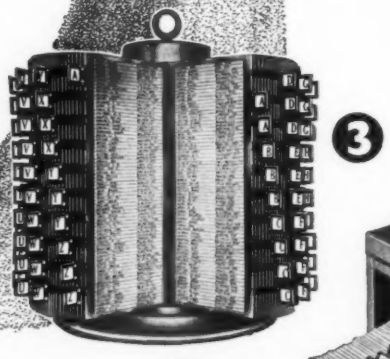

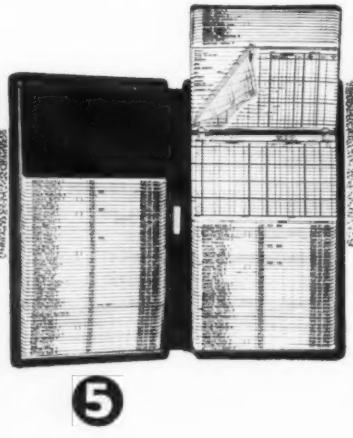

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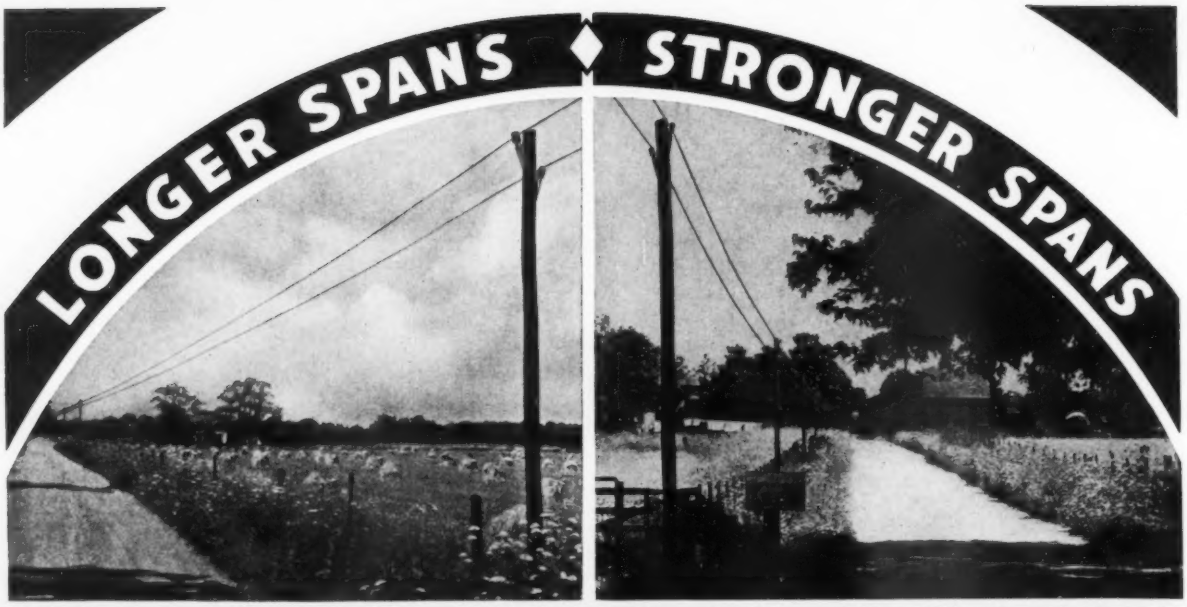

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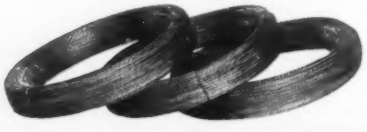

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PREVENTIVE MAINTENANCE

Of Rural Lines

By RAY BLAIN

***REGARDLESS OF HOW WELL** lines are constructed, regular inspections and complete overhauls are necessary if the service is to satisfy subscribers and the state regulatory commission. The "ten-point" maintenance program suggested in this article literally clears trouble before it happens*

STATE regulatory commissions in considering applications for rate increases usually inquire about the quality of service rendered. One state commission which pays considerable attention to service and has adopted service standards, some months ago received application for higher rates. It came from a rural line company the switching for which is done by an exchange company.

The rural company, which has about 45 subscribers, asked for a 50-cent a month increase in its rural multi-party residence rate. The commission granted the increased rate on condition that a general check up and overhaul of the company's operating property be made prior to the inauguration of the proposed rate, with particular attention being given to the following ten items:

(1) Replacement of broken poles; (2) pulling of slack from line wire; (3) proper trimming of trees and freeing of lines from possible ground leaks; (4) replacement of insulators, pins, brackets, or crossarms, when necessary; (5) elimination of high resistance joints from line wires;

(6) Replacement of line wire where improved transmission is necessary; (7) proper transposition and insulation of lines with reference to nearby electric lines; (8) proper connection of subscribers' stations with lines; (9) replacement of weak or otherwise defective dry cell batteries; and (10) proper attention to reports of trouble.

Any telephone company would do well to observe a similar ten-point program when conducting periodic overhauls of its lines. Regardless of how well lines are constructed, they must be checked over and completely overhauled at regular intervals if they are to provide a commercial grade of service, satisfactory to both the subscribers and the state public service commission or other regulatory body.

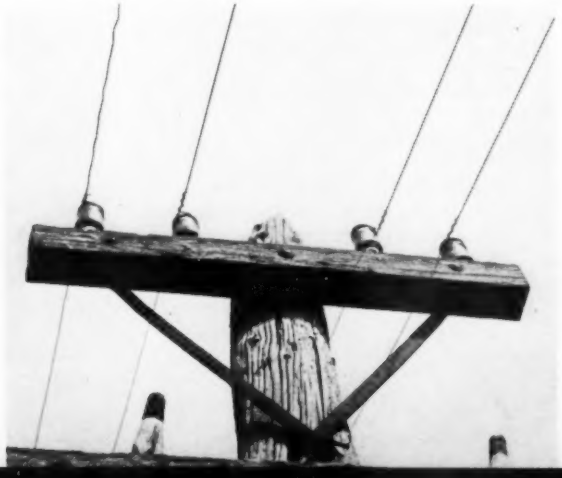
The interval at which these

This is a good bracket lead. The brackets are spaced properly and all wires tied-in correctly.

Pins which come loose from the crossarms and ride on an up-pull are known as "floaters." This condition, if permitted to remain, will soon cause trouble.

BELOW: An unusual arrangement where wood brackets are nailed on crossarms. While this gets the job done it is not recommended. It is not considered much cheaper than a regular crossarm and certainly is not as satisfactory.

BELOW: Wires are all in place and tied-in properly, but all are not on the correct side of the insulators. The through bolt should be placed so that the nut is on the crossarm, and a lag screw instead of a nail should be used to hold the crossarm braces in place.



LOWER RIGHT: This rural lead has been placed too close to the power line in the foreground. This condition is not only dangerous but will undoubtedly cause interference on the telephone line.

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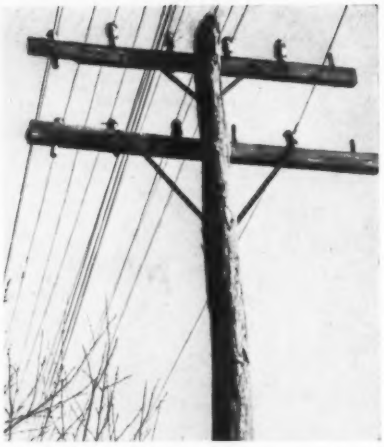
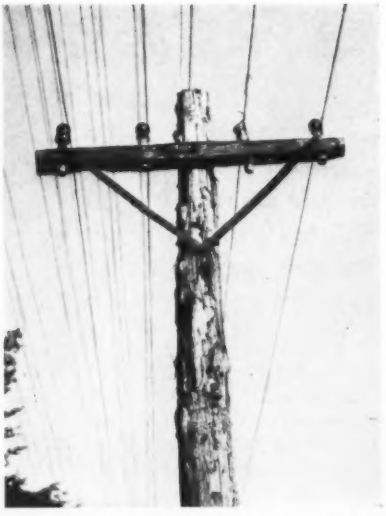


These crossarms are old and decayed and should be replaced. The pull on the wires is down and two of the pins have pushed through the crossarms. If the pull were up these pins would form "floaters."



A good example of a native pole used on a rural line. Note that the crossarm is mounted firmly on the pole and all wires are in place. However, the splices do not look good and from all indications they are causing noise trouble and low transmission.

Leaning poles may be due to not tamping them in properly when they are set or they may be nearly broken off at the ground line. This condition should be investigated and cleared without delay.

periodic overhauls should be made depends in the great part on the type of construction used and the climatic conditions of particular localities. Some companies conduct overhauls twice annually, while others find one annually is adequate. There is no doubt, however, that these overhauls save money in that they tend to keep subscribers satisfied and materially reduce the number of trouble trips on lines.

In the average exchange an overhaul every six months should prove desirable. Naturally, there will not be as much work necessary on an overhaul made each six months as when one is conducted each year. In this article, a ten-point plan will be outlined, which is considered suitable for use on periodic overhaul of the average rural line. As space is limited the facts and directions are boiled down to the bare essentials.

Replacement of Broken Poles in Rural Leads

There is no doubt that broken poles in all telephone lines should be immediately replaced or reset. If permitted to remain, they may in a very short time pull down a section of the line and cause a serious interruption of service. Ordinarily, rural line poles may be reset and still provide proper clearance for the line wires, except when the broken pole occurs at a road crossing; in such event it must be replaced. Poles may be stubbed in these locations, but the saving to be gained from this method is always doubtful.

Poles are not expensive now. Ordinarily for normal rural line use they need not be of a large size. When poles are stubbed, the short length of old pole or other timber used to hold the broken pole in place, may be lashed to the latter with wire and tightened with a through bolt. Special stubbing clamps may also be obtained which make the job considerably easier.

Leaning poles should be straightened and tamped in place. When setting new poles, care should always be taken to dig the holes to the proper depth so that the full holding power of the pole in the line may be obtained.

Pulling of Slack from Line Wires

The pulling of slack from line wires is another important item which should be observed in the proper maintenance of all rural lines. Poles may be of proper height, but necessary clearance just cannot be obtained when wires slack in some spans to the fence tops. Anything may be expected to happen in wires with this amount of slack—and it generally does. Also, when an equal amount of slack is not provided in each wire of the lead, the wires will not swing equally in the wind; they may wrap around one another, resulting in shorts and crosses.

It is always a good plan to untie the wire, strengthen the corners and then pull out all the slack until each wire of the lead has the proper tension and all wires are even in the span. This will cause all wires to swing evenly in the wind and they will seldom cause trouble due to wrapping about one another. This action will also permit maximum clearance with the existing pole length over all gate and road crossings.

After the pulling of slack, all wires should be tied-in on the insulators in an approved manner. Wires should be placed on the insulators in such a manner as will cause them to pull toward the insulator. This will place the strain on the insulator and not on the tie wire as that would soon cause trouble.

Trimming of Trees and Line Ground Leaks

Trees should be trimmed so that all branches will clear the line wires a sufficient distance to insure their clearance until the lead will be covered again on a periodical overhaul. Many are of the opinion that branches do not cause trouble on a line except in wet weather, but that is not true. Contact with green as well as wet tree branches causes high resistance grounds on the line. Several of these small leaks allow considerable waste of the weak voice

Trees should be so trimmed that none of the branches will touch the line wire before another overhaul. This old apple tree is in direct contact with the line wires and is certain to cause leaks and loss in transmission.

currents and a consequent loss in transmission.

Lines should be routed to clear trees, but when this is not possible they must be trimmed to satisfactorily clear all line wires. Special long-handle tree trimmers, operated with a rope, will be found most useful in keeping small limbs from growing into the line. These tools may be used without fear of causing serious damage to valuable trees.

When large limbs must be removed, the trees must be climbed and a saw used. Trained men should be employed for this work as it will probably prove cheaper than payment for the damage to expensive trees.

Replacement of Insulators, Pins, Brackets or Crossarms

A superior grade of glass is now being used in the manufacture of insulators, but even so they do break occasionally. Any broken, chipped, or cracked insulator must be considered defective and should be immediately replaced. One broken insulator will cause a serious transmission leak in stormy weather—and wet weather insulation must be considered on all telephone lines.

Broken or floating pins should also

This pole illustration shows that through bolts are loose and lag screws which hold the braces on these crossarms are missing. Such condition should be cleared immediately.

be replaced immediately as they are certain to cause trouble if permitted to swing for any length of time. Rotting crossarms will often cause the pin to pull free on an up-pull of the line. When iron nails are used to hold pins in place, they may rust out in a short time and cause the pin to loosen and pull out of the crossarm. The use of galvanized nails is suggested for holding pins in place on the crossarms.

Brackets should be well nailed in place on the poles and when they loosen or split should be immediately replaced. Wood brackets are ordinarily made of oak and are either painted or treated with creosote. Binders are now available for use on brackets which enable them to hold extra strain without splitting.

Crossarms usually last a long time, but occasionally one will go bad and must be replaced. When any crossarm becomes the victim of dry rot, it should be replaced before it can cause serious trouble and interruption of service on the line.

Elimination of High-Resistance Joints from Line

High-resistance joints in any rural telephone line can cause serious trouble. Many of the old-style twisted-type joints rust and corrode causing an unbalance, noise and transmission loss. When a joint becomes defective, the only remedy is to remake or replace it. Often in

The push brace on this corner pole is not properly installed. The brace should be longer and should extend farther from the pole.

the process of pulling slack, defective joints may be cut out. When this is not possible, two joints must be made to cut out one or several defective joints. Sometimes a span or two of new wire may be placed in the line to effect the removal of several defective joints.

Use of the new compression type sleeves is recommended for making splices. They are convenient to use, strong mechanically and good electrically. This type of sleeve is not expensive and is convenient to use. The wire must always be well cleaned before inserting it in these compression type sleeves if they are to make good electrical joints. It will be surprising how greatly transmission that is poor may be improved by replacing a few of the defective old-style twisted-wire joints.

Replacing of Line Wire to Improve Transmission

Too often an effort will be made to give good service over old rusty line wire years after it has outlived its economic usefulness. Also, due to rural electrification, lines have been changed from grounded to metallic and one new wire strung. An effort is then made to give service over one good and one bad wire, and everyone wonders why the line is noisy.

This is false economy and the old rusty wire should be replaced immediately in all such cases. After all, wire is not overly expensive and good wire will always prove more economical. Frequently only two or

(Please turn to page 59)

in the Nation's Capital

by Francis X. Welch

Special Washington, D. C., Correspondent for TELEPHONY

***NATIONAL DEFENSE** plans, brought into prominence by the rapidly-changing international situation, require much communications equipment. . . . Retarding influence by administration officials has prevented business from developing facilities for carrying out preparedness program. . . . Interstate rates of some Bell System companies under scrutiny of FCC*

WITH INTERNATIONAL affairs moving at such a fast pace that even newspaper reports become obsolete almost as soon as they hit the street, it is difficult, through the necessarily more deliberate medium of a weekly magazine, to discuss developments in Washington and elsewhere without running the risk of having the result appear somewhat stale or irrelevant.

Routine regulatory items which might reasonably command our attention during normal times seem somehow quite futile and almost out of place—something like a cat fight within the shadow of a four-alarm fire. So taking the obvious cue dictated by the tragic situation which obsesses every rational adult mind, let us try to consider, even in a rather sketchy fashion, how the war abroad and its impact on rearmament agitation at home may affect the communications industry.

For the manufacturing branch of the telephone business there is an immediate stake in the broad plans announced by President Roosevelt to arm America to the teeth. Fifty thousand airplanes a year, for example, must all contain radiotelephone equipment, and there will have to be a considerable pick-up in the tempo in the manufacture of certain ground communications facilities suitable for military usage.

Each individual manufacturer knows (better than anyone can tell him) just how, if at all, his concern might participate in this program. At least one effect of the tragic lessons learned from European engagements has been the necessity of revising or at least re-examining all prevailing usage with respect to military equipment. New techniques in communication, for example, are quite likely to be employed to go along with radical new methods of military operation which have been successfully demonstrated. Much of the old stuff will have to go overboard.

For the manufacturer of communications facilities this may mean starting from scratch and, therefore, an opportunity. It has always been that way in the history of military tactics. In our own Civil War when General Sherman violated cardinal principles of orthodox strategy by marching away from his own lines of communications and supplies, the experts of that day were calling him a mad man. But when he arrived at the Atlantic coast after breaking the backbone of the Confederacy, he was hailed as a genius—and military students abroad, as well as at home, have been studying about him ever since.

And that is the way it has been with recent drastic departures by the German army from established principles. The very idea of sending whole tank corps into enemy country without protection of flanks or infantry support would have made Von Hindenberg gasp. But he lived in a day before tanks could get support and direct communication from accompanying air-bombers.

In other words (to reflect what officers are saying these days in Washington) the military equipment field is wide open in the light of revolutionary disclosures of the past few weeks. Therefore, the manufacturer of even small or minor items of equipment who can, figuratively speaking, produce a better mouse trap will find himself very welcome around Washington these days.

OBVIOUSLY, the situation calls for research, much of which has been going on here in America in our industrial laboratories. But one particularly irritating fly in the ointment has been the retarding ef-

Interesting sidelights on the various changing activities in Washington, D. C., are presented each week by FRANCIS X. WELCH.

fect of a governmental bureaucracy which, until very recently, has shown a disposition to harass rather than encourage industrial enterprise.

Not long ago a manufacturer of mobile kitchen units, who had been selling items to the government off and on for some time, was told by army officers that his stuff didn't move fast enough for modern operation. He was reproached for trying to sell, practically, the same thing that the army used in the last war. He was asked whether he had been asleep all these years.

He replied that he hadn't been asleep but had even been awake nights filling out numerous reports for this, that, and the other thing which various government agencies wanted to know about his business. He claimed that bureaucratic bookkeeping had drained his resources for research.

Well, maybe that is an exaggeration, but there is certainly some basis for the demand that the administration in Washington should release the bureaucratic brakes on the industrial machine if it expects 100 per cent effective and wholehearted cooperation between private enterprise and the government in the task of making America invincible.

This is not to suggest that all the New Deal reform statutes should be repealed forthwith—although some of them, such as the National Labor Relations Act, could admittedly stand considerable overhauling. Rather, it is the human equation in Washington that should be looked into right away.

It is all very well for the administration to call upon business to put its shoulder to the wheel and forget about by-gone differences in an hour of great need. The administration must do its part and clean house of some of the one-track mind reformers and "redeem-the-world" idealists, who still occupy strategic positions on many of our important government agencies.

These officials are doubtless sincere but none the more practical for all that. For example, last fall when European war broke upon a startled world, the state of our defense was suddenly thrust into the limelight and something had to be done. Assistant Secretary of War Louis Johnson took the obvious line of organizing a board to be composed of high government officials, as well as industrialists with World War experience in such matters.

This was known as the Stettinius board. You may recall that Walter S. Gifford, president of the A. T. & T., was named to it, obviously for purposes of bringing the important factor of communications facilities into an appropriate position of representation.

Well, what happened? The young New Dealers took one look at the Johnson list and let out a howl. Where, they asked, was organized labor's representative? How was the consumers' interest, the social viewpoint, the this, that, and the other fetish of the professional "do-gooders" to be taken care of? Under this pressure the President wilted and the Stettinius board was politely thanked and put back in the icebox.

Many executives in the telephone industry today can recall from personal experience how well industry pulled at the same oar with the federal government during the last World War. Woodrow Wilson surrounded himself with such important practical business figures as Bernard M. Baruch, Owen D. Young, the late Edward N. Hurley, and others whose ability to get things done was recognized in the White House.

Today, or at least at this writing, you can look in vain all over the city of Washington for any really important industrial figure in the business world who isn't, by chance, sleeping in a hotel room — perhaps on a periodical summons to Washington for investigation or heckling by bright young men, almost fresh from the ivy-clad walls of some academic institution.

IT IS THIS very atmosphere of suspicion of big business and little business that must be dissipated before the proposed government-rearmament machine can be expected to hit on all cylinders. Business has tried to "cooperate" with Washington before during emergencies and doubtless will continue to do so. But it should not be surprising if they are a little timid about getting too close to the very same crowd that has heretofore taken such a delight in giving them the hot foot every chance they got.

In a word, there should be a cessation of punitive investigation, an adjournment "for the duration" of unnecessary regulatory hamstringing and continual boat rocking. Incidentally, the FCC, through its recent fumbling and grumbling in the field of television, has not been among the least of the Washington boat-rockers.

So far there has been no evidence in Washington that the administration has any idea of disciplining the gay young element that has had such a grand time for the last few years beating the tired old business man around the bush. There has been no encouragement for the idea that there should be a thorough bipartisan inspection into the management of our defense organization. The Army and Navy departments are still handled pretty much from the top with considerable backseat driving from other quarters.

There are still those high in command who are apparently more concerned about such matters as the closed shop and minimum labor standards than in the actual tempo of production in the proposed accelerated armament program. There are still those in high official places who demand an aggressive foreign policy but whose own left-wing, and even pacifist, background reveals a consistent attitude of opposition to

(Please turn to page 55)

FRONT COVER

The Lincoln Tomb and Monument in Springfield, Ill., shown on the front cover, is an imposing memorial to the noble and beloved president of the United States who wholeheartedly believed that our government should be "of the people, by the people, for the people." Abraham Lincoln was not interested in personal gain and aggrandizement; material things counted little in his plan of living. Self-educated, he spent his life trying to aid his fellowman and to live up to his beliefs.

This beautiful and inspiring memorial was built in Oak Ridge Cemetery in Springfield with funds appropriated by the state legislature, following an attempt by thieves to steal Lincoln's body from its old tomb on a hillside; it was believed they planned to hold it for ransom. Inside the new tomb are many sculptured likenesses of Lincoln in varying poses, each an interesting study of his character. People from all over the world visit the memorial every year to pay tribute to this great man who lived "With malice toward none; with charity for all."

Next week The Illinois Telephone Association will hold its annual convention at Hotel Pere Marquette (another familiar name in history) in Peoria, May 28 and 29. Illinois telephone people are proud that their state forms the background for Abraham Lincoln who faced and overcame great odds, and whose life serves as an inspiration to us all.

XUM

Phases of Rural Telephone

Line Protection

By DR. ARTHUR BESSEY SMITH
Chief Research Engineer, Associated Electric Laboratories, Inc.

HERE IS A presentation of the situation which is before the rural telephone companies of the country, caused by the widespread increase of electric power lines. Proposal made of some principles to guide telephone engineers in working out a system of protection

JUST as far as it is economically sound, electric power ought to be used in the country. It is a move in the right direction. But it does bring with it certain engineering problems which telephone engineers must solve. Power and communication must find out how to live together with safety to their users. Moreover, Independent telephone engineers should not wait for someone else to do it for them. They best know their own situations and availabilities.

The major electric power companies have learned how to erect and maintain their lines so that over a long period of years there is not much chance of danger from them to telephone lines. A great deal of the recent great expansion of rural electrification is also well put up, and in its present condition is not unduly hazardous. The same thing cannot be said for all.

REA Lines Will Require Maintenance

Most of the recent rural power lines are owned by cooperative groups. As time goes on there will need to be maintenance. Poles will not last forever; the destructive forces which work at the ground line will take their toll. Guys and pole hardware will need attention. In exceptional cases a bad sleet storm will bring down the weak structures. Cooperatives have not yet proven their technical skill and fidelity in long-time maintenance, and we are warranted in expecting a degree of trouble.

The sum of the foregoing considerations is that eventually there will be a decided increase in power crosses with telephone lines and it is the duty of telephone engineers to prepare against it now.

Power and communication, says DR. ARTHUR BESSEY SMITH, must find out how to live together with safety to their users.

There are two aspects to the problem: prevention or reduction of actual crosses, and apparatus to safeguard property and people when a cross does occur.

When a power line crosses a telephone line, there is a wide variety of procedures. Some make no provision whatever to protect the telephone wires from contact with a power wire, in case the latter should break and fall. Others go as far as to have one joint pole, so as to hold the wires in a fixed relation to each other. This prevents sagging crosses, but does not always prevent a broken power wire from touching a telephone wire. A cradle hung under the power wires has been tried, but is expensive and cumbersome. The angle at which the two lines cross each other is also a factor which must be considered in planning safeguards.

A common situation is a country road with the power line on one side and the telephone line on the other. Where the subscriber lives on the same side as the power line, his telephone drop line swings across the road and under the power wires. This is usually a right-angle cross, or nearly so. If the subscriber lives on the same side as the telephone line, his drop line is in the clear, unless he has also electric service. But the cross with 115 volts (neutral grounded) is not serious as a rule.

Safety Devices for Telephone Lines

Turning now to the other aspect: How should telephone lines be equipped with safety devices to safeguard property and people against a power cross?

Though familiar to most of us, a brief description of that which was once regarded as good practice may stimulate constructive thought.

Picture the telephone lines leaving a small central office by way of the main distributing frame, equipped with heat coils and carbon block arresters with perhaps three-mil gaps, Fig. 1. At the end of the cable each wire goes past a pair of carbon blocks having perhaps a five-mil gap and through a fuse to the open wire. At each subscriber station along the way the drop line leaves the main line, passes through fuses and past carbon blocks with three-mil gaps, to the telephone instrument.

The basic thought which lay under this arrangement was that lightning would ordinarily escape by way of the gaps without blowing the fuses; and if there were a power cross, the heavy current would jump the gap in the nearest protector, blow the fuse, save the telephone or switchboard, and isolate the "hot" wires from subscribers and operators. The telephone repairman was supposed to test the line end of any blown fuse

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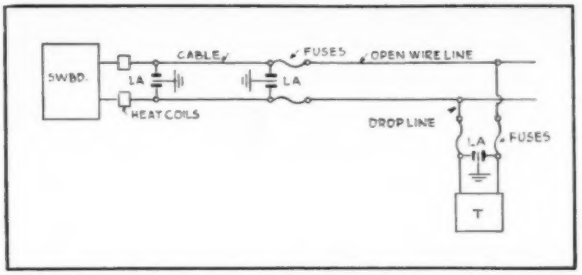


Fig. 1. Arrangement of protective devices, from exchange to subscriber's station, which up to now has been considered good practice.

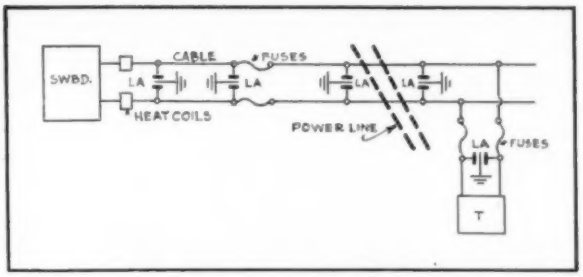


Fig. 2. Installation of pole lightning arresters in telephone line on each side of a power line crossing.

before he touched it with his hand—the dangerous emf. might still be on the line.

How did it work in practice? Starting with one-ampere fuses and those a little larger, severe lightning operated them so often that it interfered with service. This induced the use of larger fuses until today five-ampere and seven-ampere fuses are common.

From the early hazards of trolley current at 500 to 600 volts the electrical pressures have risen until today it is not uncommon for telephone lines to be exposed to the possibility of a cross with a wire carrying 6,900 volts, its return being solidly grounded. It is evident that fuses designed for the former emfs. will not take care of many modern situations. There have been fires caused by such a high emf. that the telephone fuse could not open it.

These facts are forcing people to a completely new survey of the whole matter and already changes have been made and untried suggestions are being discussed. Out of all these we believe will come the principles and practices which will best promote safety and least practical outage of lines.

Must telephone line fuses and their housings be re-designed so that they will be able to quench the most extreme emfs. which may get crossed with a telephone line? Is it wise to go to this expense? Or is there a less expensive way which is just as good?

There is a feeling among some people that things should be so arranged that if there is a power cross, the dangerous potential cannot be left on the telephone line. Some have even taken steps to obtain this end.

Lightning Arresters at Power Line Crossings

Suppose that to the foregoing described protection, Fig. 1, there were added a lightning arrester on the first telephone pole on each side of a power crossing, Fig. 2. If this arrester can endure the arc until the crossed wires burn off or the power circuit-breaker opens, the telephone wires will be kept at a low potential and there will be no danger to the rest of the telephone property and none to telephone users and operators.

But there are cases in which the rural power line follows the telephone lead for many miles, now on one side of the road, now on the other. The telephone company was there first and took that side of the road which seemed best, crossing the road wherever it seemed well to do so. When the power line came along, it was necessarily kept to the opposite side, which involved many crossings. If the telephone company applies an arrester on each side of each crossing, it may in some cases average one protector per mile.

Since there may be so many arresters on the poles, some have reasoned: "Why not make it a rule to equip each rural telephone line with pole arresters at regular intervals, regardless of power crossings? If it is a rule, there is less danger of forgetting to install them where they are necessary."

Again this thought has appeared: "If the telephone line is to be well-covered by pole arresters from one end to the other, and the line wires themselves are expected to act as fuses in case of power cross, why have any fuses at all at the substation?"

All these arresters will surely maintain the telephone line at a low and safe potential and there can be no burned-out fuses with "hot" ends to endanger the repairman. As an extreme view: "Why have any substation protector at all? Why not rely completely on the pole arresters to safeguard both property and people?"

There are some lines of reasoning which, if followed to their ultimate conclusions, lead us into absurdity, or dangerous practice, or both. Human reason must always be founded on the facts of experience, and the results of speculation must be verified by experiment or natural experience. Let us keep close to facts.

If the main reliance against the danger of power crosses is placed on pole arresters, the matter of increased outage of lines must be considered. While some of the best engineering requires a three-mil or a four-mil gap at the main distributing frame and substation, there is no good reason for using such a small air gap on poles. Gaps all the way from 5.5 mils to 10 mils are being used in pole arresters. They seem to protect the lines and yet give little trouble from unnecessary groundings.

One factor which vitally affects the use of the substation protector and the air gaps and fuses in it is the requirement of the Underwriters Laboratories, Inc. The lightning arrester is required to operate at 750 volts direct current, which precludes the use of large gaps. In case of personal injury, the fact that the telephone company used a protector which is listed by the Underwriters Laboratories is a very valuable asset. As to the capabilities of fuses, the requirements need revision, if as much as 6,900 volts and heavy current must be broken without destroying more than the fuse.

Outside Substation Protector Always Accessible to Troubleman

One of the valuable changes in the substation protector has been the removal of it from the inside of the building and mounting it on the outside in a weatherproof housing. This renders it always accessible to the troubleman. It also keeps "hot" wires out of the house and where there is no excuse for the subscriber touching them.

As a step in the direction of avoiding high potential on the telephone

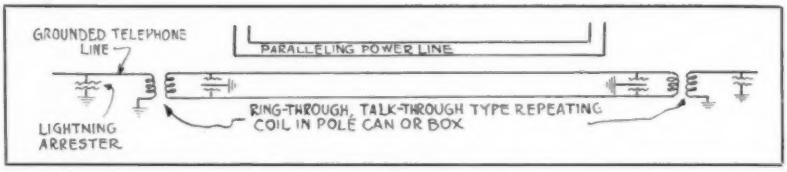
(Please turn to page 56)

***THE MANAGEMENT** of a small telephone company often spends many days of anxiety before arriving at a solution of questions arising from inductive interference due to proximity of REA power lines. The author of this article has been through the mill and offers many suggestions on*

How to Meet the REA Problem

By A. L. ERICSON
Manager, Hector Telephone Co., Hector, Minn.

THE SMALL telephone company serving a rural community over grounded rural lines has monthly service rates established many years ago, which were based on the cost of maintaining one-wire lines. Suddenly it is confronted with the problem of converting its entire system to metallic because of the appearance of disturbing power line interference which, from a practical point of view, will completely disrupt service on its grounded lines. The men responsible to the community for maintaining telephone service are placed in a position where they perhaps will spend many sleepless nights and days of anxiety before they arrive at a solution to the problem.


GROUNDED TELEPHONE LINE
PARALLELING POWER LINE
LIGHTNING ARRESTER
RING-THROUGH, TALK-THROUGH TYPE REPEATING COIL IN POLE CAN OR BOX

Use of repeating coil to metallicize grounded telephone circuit for short length of power line parallel. It is not recommended as a permanent solution of the interference trouble.

Typical rural bracket line in area subjected to heavy ice and wind loading. Spans of high tensile line wire average approximately 350 feet.

Exchange lead with 350-foot spans of HTL-135 in heavy loading district of northern Indiana. Ten-pin crossarm construction is used.

From the viewpoint of a telephone manager who has recently been through the mill and has been required to meet conditions as outlined in the preceding paragraph I will endeavor to pass along a few ideas based on our experience which it is hoped in a small way may be of assistance to some of these rural companies.

Public Will Pay for Better Service

Of course, the first thing that enters the mind of the telephone man, who has been serving his community at very modest rates, is the absolute impossibility of securing from his subscribers a rate which will produce enough revenue to warrant the increased investment of adding another wire to his circuit and the additional maintenance which will inevitably follow.

In connection with increasing rates the telephone company necessarily is brought face to face with the public as well as its state regulatory body. Naturally the telephone man shudders when he thinks of raising rates. However, the experience of telephone companies in all sections of the country has proved without a doubt that if the matter is properly handled, if the public is thoroughly sold on the idea that they are to receive better service, they will gladly pay the necessary increased cost. And if facts are properly presented to a regulatory body, no difficulty will be encountered there.

The matter of rates, while they may loom as the first obstacle, will be the last thing to adjust for our obligation as a public utility is first to provide satisfactory service—and if such service meets with the approval of the public and the regulatory bodies, where there are such, we are then entitled to recompense.

The matter of rates, the matter of public relations, and our relations with regulatory bodies as well, will take care of themselves, to a large extent, if we provide satisfactory service.

The big job and the first thing to do then, is to proceed to put the plant in such shape that the subscribers will receive a grade of service even better than that which they enjoyed before the appearance of the power lines with their disturbing noise.

When we begin to figure the cost of metallicizing a plant it always runs into a lot of money, and it will be necessary to effect economy wherever possible in order to hold the cost down to a reasonable figure. Where old lines are completely rebuilt, some economy can be effected by long-span construction and, in most cases, shorter poles can be used.

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It must be taken into consideration, however, that economy in construction should not be carried to a point where future maintenance might become excessive because of failure to provide proper clearance. After all, good construction is not a great deal more expensive than poor construction, and the difference in service will pay good returns in the form of satisfied subscribers.

Essential Requirement in Metallicizing Line

The most necessary requisite in metallicizing a line is to provide a well-balanced circuit, positively free from grounds and high resistance of any kind. Each wire of the circuit must have the same resistance. It is not advisable to use one old wire and one new unless all old joints that might have high resistance are cut out of the old wire and these properly sleeved. The compression type sleeves, which are now on the market, make a very satisfactory joint.

In addition, transpositions should be cut in at frequent intervals in order to balance out power line interference, crosstalk from other circuits and, if one old and one new wire is used, to balance out any slight difference of resistance which there might be between the two sides of the circuit.

If only one circuit is run on one set of poles, it is only necessary to place transpositions at regular intervals, for which there is no fixed rule as to distance of spacing. A one-half mile spacing between transpositions works out very satisfactorily.

Transposition pole in long-span exchange lead using 350-foot spans of high tensile wire.

There may be some advantage in spacing these so that a transposition is placed in the exact center of short exposures; especially so if such exposure consists of a power line running very close to the telephone line.

If several circuits are run on one set of poles, location of transpositions should be carefully worked out so that each circuit will be balanced against every other circuit as well as against any power line exposure that might be present. Such transposition schemes may be readily obtained from any of the larger telephone companies.

Tree Grounds Are Constant Sources of Trouble

After power lines are energized, the one trouble that perhaps will stand out more than anything else will be noise on the lines caused by tree grounds. The writer can recall several instances where trees had been allowed to grow into and all around telephone wires. Where grounded lines had been in use for a number of years, tree contacts were permitted to such extent that large branches and even large trees would grow completely around a telephone wire so the wire would pass directly through the trunk of a tree without causing serious difficulty with the grounded line service.

Here is where a new standard of both construction and maintenance must be adopted. The well-insulated metallic line which is exposed to several miles of REA power line—although the power line may be on the opposite side of the road for the entire exposure—will absorb energy from the power line. This may be partly through inductive coupling

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Cost of Metallicizing

Additional & Heavier Poles	$1,385.60
Additional Cross Arms	523.20
Locust Pins	100.80
Cross Arm Braces & Bolts	277.54
Additional Brackets	111.04
Additional Glass Insulators	384.00
Additional Line Wire	1,830.58
Additional Drop Wire	770.00
Fork Bolts	200.00
Material	$5,582.76
Labor required for stringing wire, tree trimming & other additional maintenance	3.070.00
	$8,652.76

Above is a statement showing the approximate added cost which your Telephone Company has had to shoulder in connection with metallicizing its plant and maintaining its lines up to the end of 1938. The change to a metallic plant, with the added capital and maintenance expenditures, has become necessary because of R. E. A. power lines. The January sleet storm leveled a whole mile of heavy pole line which apparently was in good condition. This is a gentle reminder of the fact that with added load on our pole lines replacement and maintenance will necessarily be materially increased.

The additional cost referred to in the above table if divided among all our subscribers, including town residence and business telephones, would amount to $17.69 per subscriber. If divided among all rural subscribers the amount per subscriber would be $30.14, and if divided among only the rural subscribers whose service was converted from grounded to metallic during 1938 the cost would amount to $48.33 per subscriber.

An Appreciation

We wish to thank our patrons for their splendid co-operation during the past year. Last summer when power line interference had made communication over our rural lines exceedingly difficult, complaints were the exception and not the rule.

Steadily mounting costs have threatened the very existence of small telephone companies during the past few years. However, it gives us pleasure to report that in the face of these changing conditions, during the last two years 28 new and former subscribers have been added to our list.

We are doing everything possible to maintain for this community satisfactory and efficient telephone service. The support which has been given us by our patrons and the re-connect orders we have received, have led us to believe our efforts have met with approval.

If you have a friend or neighbor, who does not avail himself of the convenience of telephone service, why not suggest to him that he also take advantage of the security a telephone provides.

Hector Telephone Company

Copy of folder mailed to subscribers after plant had been converted to full metallic circuits and an adjustment made in service charges.

A section of a four-wire line using six-foot four-pin standard crossarms. The front pole is a six-inch top 30-foot pole used to get the necessary clearance over the highway.

Long-Span Construction

Aids Economical Operation

By OSCAR HITT
Secretary, Tenney Telephone Co., Alma, Wis.

***LONG-SPAN CONSTRUCTION** of rural lines with high-tensile strength steel wire has proved to be the answer to management and operation problems of many companies. The advantages of long-span construction and some experiences in correct installation are discussed in this paper presented at convention of the Minnesota association*

SINCE THE beginning of the economic depression the consumer's dollar has demanded more value in return or, putting it in another way, less money has been paid for the same value received. This is true in all lines of industry but nowhere has this demand been stressed more than in the utility field where some consumers and politicians used the utilities as a target for lower rates.

Especially was this true in the telephone field where subscribers in rural areas discontinued service and the lines went down due to the loss of revenue needed to maintain them. And there is the area that had not been covered before because prospective subscribers lived so far apart that the cost of service, due to the type of construction used, would be too expensive. Further, the expansion of rural electric lines caused inductive interference on grounded telephone lines, necessitating the rebuilding and metallicizing of the circuits.

To meet the problems in these situations we have to think of lines that can be constructed cheaper and the answer is long span construction with the use of high-strength steel wire. With this type of construction the cost can be reduced from 25 to 35 per cent, as compared with the type of construction we have used for the last 35 or 40 years.

Properly defined, long-span construction for rural lines in the telephone industry, is the use of longer spans than with regular B.B. wire; using a wire of ordinary size with a tensile strength that will hold the wire at a sag not much greater than the sag in wire on ordinary spans. Frequently telephone lines are seen with poles so far apart that the wire almost sags to the ground. That is not long-span construction; it is poor and weak construction.

The secret of good long-span construction is not in the use of longer poles, which greatly increase the cost of the line, but in the use of wire with a tensile strength much greater than that of the ordinary B.B. wire and using poles not any longer than ordinarily used.

Our company in the fall of 1938 built 11 miles of long-span construction using 30 miles of extra high-strength wire and last summer when the weather was hot, the wire didn't seem to sag any more than when it was put up. This shows that the wire has great reserve tensile strength above that necessary to suspend the wire on the poles. This experience convinced us that long-span construction with this extra high-strength wire will stand up, and we are using 53 miles more of that type of steel wire this year.

We always note that when iron wire is strung on long spans it will sag in warm weather and will not come back up again when the weather gets cooler. I think a good comparison between the extra high-strength wire and the iron wire is a comparison between the span lengths that can be used with the B.B. iron wire and those that can be used with No. 16 gauge soft iron wire. The comparative difference in tensile strength is nearly the same.

Saving in the Use of Extra High-Strength Wire

There are two strengths of wire greater than that of B.B. wire: the HTL-85 having a tensile strength of 793 pounds for the No. 12 gauge and HTL-135 having a tensile strength of 1,213 pounds for the same gauge where the B.B. wire ordinarily used has a tensile strength of only 476 pounds.

From these figures it can be easily seen that with the use of this extra high-strength wire the spans can be greatly increased without sacrificing reserve strength in the line necessary to withstand wind and sleet.

The cost of extra high-strength wire is $2.35 per mile more than that of the B.B. wire or the high-strength

HTL-85. The saving of only one pole in the line will pay the extra cost of the extra high-strength wire.

With the use of the high-strength HTL-85 wire approximately seven poles can be saved per mile, and with the extra high-strength wire 14 poles can be saved per mile, resulting in a saving of 20 to 35 per cent in the cost of the line, an item which is necessary and welcome at the present time when rates must be kept as low as possible to keep subscribers, and also when other costs are increasing.

Advantages of Long-Span Construction

The advantages of long-span construction over the ordinary wire construction are many as follows:

(1) Lower construction cost;

(2) Many corners can be avoided by going over corners of fields and other places where with the shorter span construction we would have to go around them; (3) The line is easier to route and stake; (4) we can make use of the higher points over rolling country and over hills, eliminating the longer poles;

(5) The line needs less grading, thereby eliminating the longer and more expensive poles; (6) In case of moves for road construction fewer poles have to be moved, reducing greatly the cost of moving; and (7) last but not least, when we have one of those extremely severe sleet storms, fewer poles have to be replaced.

Long-span construction should be used or a change made to it when:

For dead-ends and branch take-offs the No. 502 porcelain strain insulators are to be recommended. The Tenney Telephone Co., Alma, Wis., has used this type of construction on BB wire lines since 1925.

(1) The line has to be rebuilt; (2) The line has to be moved; (3) It becomes necessary to metallicize the line; and (4) the wire has to be replaced.

Long-span construction can be used for two and four-wire lines and also for six and eight-wire lines, but when used for six and eight-wire

This photograph shows vertical construction for a sharp corner on a four-wire line. Primary power brackets are used for the line wires. These brackets are also used on two-wire lines for sharp corners.

A long tangent of a four-wire line using six-foot four-pin standard crossarms and five-inch top 20-foot poles in spans of 300 to 400 feet.

lines the poles must be brought closer together so as not to overload them. The spacing between wires must be greater for long-span construction than for the usual type of construction.

For two and four-wire lines the spans can be made about 350 feet and up to 400 feet and, in extreme cases where clearance can be had, up to 600 feet. We have a span of 600 feet and the wires are still sagged perfectly. Spans, of course, vary to accommodate local conditions and pole settings must be made at places to get the necessary clearance for the wires.

From past experience we have found that to get the strongest line,

Six-pin crossarm rural lead of HTL-135 line wire in heavy loading district with spans of 350 feet.

we must use poles as short as possible. For two and four-wire lines, sturdy five-inch top, 20-foot poles can be used. For road crossings and more clearance, five-inch top 25-foot poles can be used. For six-wire lines, six-inch top poles can be used; and for eight-wire lines, seven-inch top poles should be used. For four-wire lines it is best to use crossarms six feet long, having a spacing of 20 inches between the wires; for six-wire lines, an eight-foot six-pin crossarm, and for eight-wire lines, a ten-foot eight-pin crossarm.

On two-wire lines heavy short-necked wood brackets can be used with a spacing of at least two feet between the wires and additional spacing for the extreme long spans. For sharp corners for two and four-wire lines, insulated clevices should be used; for right angles, primary power brackets are recommended. For dead-ends, No. 502 porcelain strain insulators should be used.

Low strain deep-groove insulators are recommended for long-span construction. For the high spots in the line it is well to use a top groove insulator.

Splicing Sleeves and Sag of Line Wires

The sleeve used for splicing the HTL-135 wire is a galvanized steel single-tube sleeve, 2½ inches long. A Nicopress compression tool is used for compressing the sleeve onto the wire. Five presses of the tool are made on each half of the sleeve.

For sag of the wire in the span, we have pulled it up considerably tighter than recommended by the manufacturers and have experienced no trouble. By pulling it up tighter, a neater and better-looking job is made and shorter poles can be used, decreasing the cost of the line. We give the wire a sag of about 18 inches for a 300-foot span. In real cold weather we give it a trifle less sag and in real hot weather a little more. For pulling up the wire we

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THE BUSINESS END

Of the Telephone Business

By SAMUEL TUCKER
President, Pleasanton Telephone Co., Pleasanton, Kans.

***UPON THE SHOULDERS** of the board of directors of a telephone company rests the burden of the financial and service requirements of the business. This excellent address given before the Kansas convention emphasizes the far-reaching responsibility of the directors and shows how pitfalls may be avoided*

THERE IS a small group of persons who, although they do not meet the telephone public, as a rule, nevertheless have a great responsibility and they must pass judgment upon every phase of the activities of the telephone business. This group bears on its shoulders the burden of the financial, as well as the service, requirements of the business.

We know them as a board of directors, the chosen few, who are voted into office of a corporation by the shareholders or stockholders to become the legal representative of those who have their money invested in the securities which finance the enterprise owned by this corporation.

This board of directors is, of course, responsible to the stockholders for the proper operation of their investment—which makes this board responsible for the activities of the personnel who operate the property, namely, the lineman, the operators, the manager, the cashier, etc. All who come in contact with the public are dependent upon this board for their wages, for the policy which is to be pursued in the operation of this telephone company, of its exchanges and of toll lines owned by this corporation.

This board is responsible also to the state for the performance of the employes who serve the telephone public. It is responsible for the enforcement of all of the rates, rules and regulations which the state commission has agreed shall be used in serving the telephone public, and if complaint is made to the state by the telephone public, this board of directors must answer.

This corporate organization which has been authorized by the state to exist is represented by these directors who must be responsible for whatever authority is outlined in the corporation charter, which is the basis of authority for this corporation.

The directors of the larger telephone companies, which control a large volume of business and income, can and do employ a highly-trained personnel to head the different departments of the business and the heads of these separate departments can and do inform the directors as to the requirements and necessities. Their accounting systems are complete in order to meet the requirements of a complicated organization.

The personnel becomes more professional and the service and equipment is developed to a high degree. The speed and accuracy shown in handling a large volume of telephone traffic is one of the main reasons why our commerce and our daily press are in the front rank among the nations of the world—it is unequalled in any other nation.

Small Companies Have Many Problems

In the smaller communities, the shareholders of associations and corporations generally know the persons who are the directors of their local companies. The directors often know of the plant and service requirements of their company, where there are no department heads and the manager must be the engineer, the operator must be the traffic superintendent and, sometimes, the subscriber must be a shareholder in order to receive service. In such cases, the investment is often made without a thought of return, and the directors do not bother about that responsibility.

It is probable that many of the directors of small corporations are not fully aware of the responsibility they have assumed. They employ the best personnel as linemen and operators that the limited income will permit and expect the service to be maintained with a minimum of material expense.

As mentioned previously, the operator and maybe a chief operator become the traffic division. They handle the heavier traffic in the rush hours, then when the traffic is light they simply have to wait and answer the occasional call. There is no information bureau, no traffic department, no plant department, no commercial department and no legal department. The manager repairs telephones and maybe helps on the switchboard or assists the linemen.

The directors of such companies reply to demands for information, which come from the many government and state departments, the best they can. Any technical questions which would be simple for a department head of a large company, are guessed at by these directors of a small company, for their business may be farming or that of mechanic.

They comply the best they can, although in the eyes of the law they are expected to comply strictly with all government red tape. They simply call in the lineman and the chief operator, then look up the previous year's duplicate copy and fix up this year's form, hoping it will pass (especially after they have read the quotation of the heavy penalty for non-compliance). . . .

Among the things a board of directors should do is to limit every liability possible by adopting a set of rules and regulations which are acceptable to the state commission. These, with your rates which have been allowed by the commission, are the legal requirements binding on both the corporation and the subscribers, and no change of rates, rules or regulations can be made without the consent of the state

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commission. And each rate, rule and regulation must be impartially enforced among all subscribers alike.

Companies Often Violate Collection Rules on File

One of the most serious violations of these rules is by the telephone companies themselves. A company agrees to enforce a set of collection rules, then calmly lets those subscribers with poor credit escape payment and accumulate debts which the collector knows are doubtful of collection and, at the same time, takes the money of the good paying subscribers who need no urging. The fair thing to do, in a case like this, is to treat all subscribers alike and adopt collection rules which would not permit subscribers to pay only when they wish.

All other utilities compel the subscriber to make investments in his own home of plumbing for water service and gas service, of wiring for electric service, and then require a cash deposit to guarantee payment of his account; in comparison, the telephone company makes all investments for the subscriber and then permits the subscriber to receive service and pay for it under collection rules which sometimes are not enforced.

Then these small telephone companies — which have a low income and can ill afford a loss even though they are at fault in not enforcing their own rules of collection—complain of hard times.

The directors of these companies are not treating their subscribers impartially for rates, rules and regulations are for the company guidance as well as for the subscriber. The board of directors of every company should adopt a rule requiring a cash deposit of each subscriber who had not established a satisfactory credit. There is no excuse for any company to permit a loss of more than one-half of 1 per cent in any one year of the earned income which the company should receive—and many small telephone companies do better than this.

Another liability that should be eliminated is the establishment of a limit of distance to which the corporation will extend its lines for service to any one subscriber. Without this limitation, a demand that the company build one mile for the benefit of one subscriber would be just as legal as a request for service which requires only a drop wire from the pole to the premises.

The establishment of a reasonable distance that the company will extend its lines for any one customer, with a requirement that the subscriber assume the additional liability for unusual distances, becomes fair to all subscribers alike when this limitation is made; then the cost of service to any one subscriber does not become greater than serving the average subscriber.

"Among the things a board of directors should do is limit every liability by adopting a set of rules and regulations which are acceptable to the state commission. . . . And each rate, rule and regulation must be impartially enforced among all subscribers alike," says SAMUEL TUCKER, Pleasanton, Kans., who is president of the Kansas Telephone Association.

Foresight by Directors Will Prevent Trouble

In some instances, a rule is adopted requiring the subscriber to construct all pole lines located on his own property, thus avoiding the arbitrary attitude of some subscribers who would compel the telephone company to build arbitrary routes that are expensive. If the subscriber had to furnish the material and labor for the lines on his own premises he would be more reasonable, but this all depends upon the policy to be followed by the board of directors.

The directors should adopt a rule which forbids the connection of equipment other than the company's standard equipment to either the telephones or the lines of the company without its consent. This will protect the company from having to serve equipment which might cause poor service. But if such a rule is not in effect, then the subscriber's idea is as good as that of anyone else.

Each board of directors should cause the establishment of boundaries of the exchange area of each separate exchange by making and filing a map with the state commission showing the location of subscribers within the exchange area. Cooperation with adjacent exchange owners should be secured, if possible, in the establishment of these boundaries, thus avoiding future conflicts by subscribers moving back and forth from one exchange to another; and generally if subscribers can not move, their choice is not attempted.

Liabilities occasionally occur in the printing of a telephone directory which are sometimes dangerous if accepted. But if the directors see that every effort has been made to issue a perfect directory and a statement is made that the company will not assume liability for errors, then the subscriber must accept the directors' statement when he buys service under such terms.

Usually damage suits are thus avoided for the subscriber can not legally demand perfection or damages for the lack of it. However, the company's statement of intentions should be made for protection in the courts. All directories should be copyrighted in the name of the company, which will protect the company as well as the subscribers from the unauthorized use of names.

Every corporation should check the rules, rates and regulations of its exchanges that are on file with the state commission and request the cancellation of any rate, rule or regulation which will not be used or is out of date.

For instance, if an exchange had been changed from magneto to common battery and common battery rates were in operation but the magneto rates were still on file and in effect, any subscriber could demand magneto service at the rates on file and cause much trouble. It would be like a railroad failing to cancel some rate and a customer demanding service under the uncanceled rate; the customer would be entitled to the rate or damages.

Always remember that a rate, rule or regulation is in effect until canceled with the consent of the state commission.

The board of directors of every corporation should be acquainted with the requirements of the state commission of Kansas concerning keeping records of subscribers' stations and the cases of trouble that occur with each station.

The board of each utility corpora-

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Rural Service Improvements

Lower Sales Resistance

By W. C. HENRY
General Manager, Northern Ohio Telephone Co., Bellevue

A RURAL POLE line with old wire and magneto telephones that are 30 years old depreciate telephone service in the eyes of the rural prospect. Such conditions indicate the management is not willing to spend money on rural plant and provide subscribers with modern, up-to-date service. Experiences detailed at Ohio convention prove that farmers will pay for improved service

DURING the first five years of the threadbare 30's following 1929, most telephone companies lost from 20 per cent to 50 per cent of their rural telephones, with the small or semi-rural exchanges suffering the largest losses. City losses in proportion were less, except in industrial sections.

In the last five years many companies have recovered all of their city stations or even exceeded their previous high record, but the rural stations continue to lag. Rural sales resistance has been strong, farm prices have been low and farmers have pleaded poverty.

A tremendous expansion of power lines has resulted in a fixed monthly charge to the farmers for a period of four years; and, after being without service for six or seven years, a lot of farmers have decided that they do not need a telephone any more. This situation has presented the management of telephone companies with a serious problem, and the smaller the exchange the more serious the problem has been.

Regaining Farmer Telephone Subscribers

What can be done to regain the farmer telephones which are an absolute essential to the operation of a small town exchange? That is a question over which I have puzzled a great many hours during the last few years. Our company has tried almost everything that has seemed to offer any chance of success. Out of our experience we have come to some rather definite conclusions. These conclusions can be summarized as follows:

(1) We can not expect the farmer to have confidence in our rural telephone service if we have no confidence in it ourselves and are not willing to spend some money on our rural plant.

(2) It is hard to sell rural telephones if you have an inferior or out-of-date product to sell.

(3) Farmers will pay you more for your service, and you will have more farmer subscribers, if you will give them an improved, uptodate service.

Present-day farmers are no longer an inferior, backwoods class of people, in spite of the fact that they wail with increasing volume for more easy government money. Twenty years ago you could go downtown on Saturday night and pick out the farmers by the fact that their hair turned up at their collars and maybe had some hay-seed in it. But you cannot tell them so easy nowadays; and this is especially true of the younger generation, who must be our future prospects.

Present-day farmers have about everything else that town people have—automobiles, electric lights, electric stoves, refrigerators, sweepers and radios—and they know the difference between obsolete telephone service and uptodate telephone service. A rural pole line, old wire and magneto telephones that are 30 years old have all been depreciated out of existence, and in turn they depreciate your service in the eyes of the rural prospect.

Some actual experiences illustrate my point:

Our Kilbourne exchange in Delaware County, Ohio, about 30 miles north of Columbus, had magneto service up to June 1, 1939, and the rural rate was $1.50 net per month. Early in 1939 we filed an optional rate of $2 net for common battery, dial service, and proceeded to completely rebuild the entire area. We then began canvassing the subscribers, soliciting them for the proposed $2 automatic service.

We ran into considerable opposition. In the first place the subscribers did not want to lose Gertrude Said and Margaret McClaren, the two operators who had served them for so many years; they did not want to pay 50 cents more per month; they liked the fact that they heard everybody's ring on the line; and if the rate were raised 50 cents a month, the company would not have enough telephones left to be worthwhile for any of them to have a telephone.

There were 123 subscribers on this magneto exchange. We finally succeeded in convincing all except three of them to try the new automatic service at an increase of 50 cents per month, and the exchange was cut-over to dial service. Within a month we gained six new telephones. The exchange continued to operate until January 8, 1940, when an explosion from a gas-heating unit scattered the exchange and building all over the landscape.

Within 62 hours we secured a common battery manual switchboard, cut the cable in two and reinstalled this switchboard right back in the house of Maggie McClaren and Gertrude Said, the former operators. Due to the fact that a new building had to be built and the equipment completely rebuilt by the manufacturer, these Kilbourne subscribers are still receiving service from the common battery switchboard.

Every month since January, at least half of these subscribers, when paying their bills, have asked us when we were going to put back their automatic service. They complain about everything. They say that they never knew what good telephone service was until they had automatic service and then were forced to take manual service again,

even though it is rendered by the same operators, whom they put up such a fight to save. In addition, you may be interested in knowing that the increased rate at Kilbourne amounts to $913.50 per year, accomplished by consent of the subscribers, for an improved service.

Best Telephone Salesman in Rural Territory

We are now rebuilding our rural exchange at Ashley, Ohio. The Wheeler road running north of Leonardsburg is about two miles long and has six farm houses on it. Every spring for the past four or five years we have solicited the houses on this road and have not been able to sell a single one. In connection with our rebuilding, the construction truck replaced all poles and wires on this road in order to serve one subscriber on a crossroad at the end of this two-mile section.

When the job was finished, the construction foreman brought in three new orders for telephones along this two-mile section and we expect to get at least one more. Our best salesman in the rural territory is a construction truck, new poles and new wires and some evidence on our part that the telephone company has confidence in its rural service.

At our Ghent exchange in Summit County, Ohio, we had a Dr. Schlueter who requested that we construct a pole line to his rural residence, a distance of two miles from where we had a line. We solicited the intervening houses and could not sell a single telephone, so we billed Dr. Schlueter a construction charge of $290. He paid it under an agreement on our part that if any additional subscribers were served from this line, we would refund him $40 per subscriber. By the time the line was finished we had four additional subscribers whom we had not been able to sign up before the line was there, and we refunded Dr. Schlueter $160.

At our North Fairfield exchange in Huron County, Ohio, we had two lines extending east. In 1932 and 1933 we lost every one of the subscribers on these two lines. In 1936 we completely rebuilt these lines and made a canvass of the former subscribers with a result that we placed 15 automatic telephones in service and on the first of this month (April) 14 of them were still in service.

On Olena road southeast of Norwalk we had an old line four miles long with only three magneto subscribers on it. In 1936 we completely rebuilt this line and installed common battery telephones. Now we have 12 subscribers in this section.

Farmers Will Take Improved Service

I repeat: If telephone companies will have enough confidence in their own rural service to spend some money on improving it, the farmers will take the improved service.

The largest magneto exchange we had last year was Clyde, Ohio, with

WILLIAM C. HENRY, Bellevue, Ohio, general manager of the Northern Ohio Telephone Co., firmly believes that the average farmer is willing to pay increased rates for modern improved service and that the supplying of such service results in rural station gains.

897 magneto telephones. We completely rebuilt the exchange area over a period of two years. We then filed an optional rate for automatic service and canvassed every single one of these 897 subscribers over to the new dial service at an increased rate. The residence increase was 25 cents per month and the business rate increase was $1 per month. The total increase, by consent of the subscribers, for the new improved service was $3,780 per year.

We cut the new automatic exchange into service on December 11, 1939, and that month we had a net gain of six telephones. In January of this year we had a net gain of 11, and we have since gained telephones every month until we have 937 telephones at Clyde as of this date (April 20).

At Marblehead where we had a magneto exchange, we rebuilt the entire area last year placing automatic equipment and dial telephones in service in May, 1939. By and with the consent of 230 subscribers their rate was increased 25 cents and 50 cents a month, or a total of $1,227 a year. On the first of this month (April) we had 236 subscribers and orders for six more for May 1 installation.

At our North Baltimore exchange in Wood County, Ohio, we had a magneto exchange with 381 subscribers. We first rebuilt the area, installed automatic equipment and filed an optional rate for automatic service. Then we canvassed the magneto subscribers over to the new automatic service at an increase in rental of $988.80 per year. Since September, 1939, we have increased the number of subscribers from 381 to 404.

These examples, I believe, are sufficient to illustrate my conclusions which I again state and leave with you: (1) You can not expect the farmer to have confidence in your rural telephone service unless you have confidence in it yourself and are willing to spend some money on the service. (2) It is hard to sell rural telephones if you have an inferior service to sell, and (3) farmers are willing to pay you increased rates for uptodate improved service and, in addition, you will gain rural subscribers by furnishing improved service.

▼ ▼

Bell Increases Rates in Burlington, Iowa

M. J. Heldridge, manager of the Northwestern Bell Telephone Co., Burlington, Iowa, announced on May 8 that telephone rates would be increased at once. Mr. Heldridge stated that decreased hours of work, higher wages, and greatly increased taxes along with the company's desire to maintain satisfactory service necessitated the increase. The new rates will give Burlington subscribers approximately the same charges as are in force in Ottumwa and Clinton, Iowa. The present and new monthly rates are:

Business, one-party, increased from $5 to $5.50; private branch exchange trunk lines, from $6.25 to $7; business, two-party, from $4 to $4.75; one-party residence, from $2.25 to $2.50 and semi-public service, from 15 cents per day to 16 cents.

The monthly rates of $2 for two-party residence telephone service and $1.75 for four-party residence service will remain the same. Rural telephone service provided over company-owned lines will remain at $2.25. The rate for service furnished rural subscribers who own their own lines will be changed from 50 to 60 cents per month.

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ACCIDENTS like this will happen! But when they do, be thankful your telephones are Monophones. For these instruments are built to withstand jars and jolts that would put many an old time telephone in the repair shop. They will stand up, year after year, to the hardest kind of service with an absolute minimum of attention.

There are several reasons for the Monophone's unusual stamina. First, it has no fragile, easily-broken projections. Even the cradle prongs are shaped so that it is next to impossible to break them off. Second, both base and handset are braced internally to resist the roughest handling. Coupled with this, we have our own presses and skilled molding experts, who have developed techniques for producing moldings of great strength. Third, Monophone construction is not "skimped" in any particular. Their solid, sturdy appearance is no deception—they look strong and they are strong!

Equally important is the fact that Monophone performance is on a par with its fine appearance. Telephone executives everywhere are writing in to tell us that never before have they experienced such clear, perfect transmission —or received so many spontaneous compliments from subscribers! Write for prices and full information on Type 40 and 50 Monophones—sent promptly upon request.

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Fig. 1. Power line parallel and transposition of telephone wires to balance the circuit.

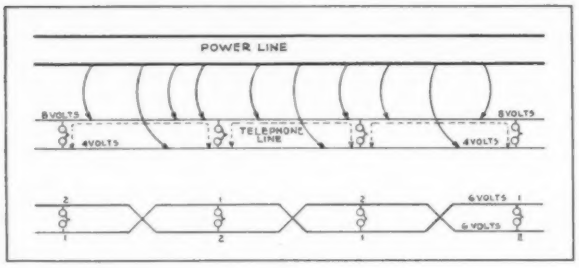
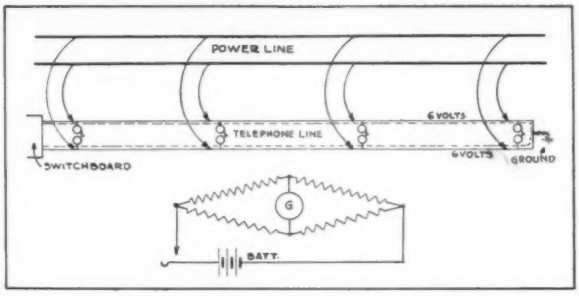


Fig. 2. Balanced telephone line paralleling a power line.



Elimination of Inductive Interference From Telephone Circuits

By J. D. KRATZ
Manager, Footville Telephone Co., Footville, Wis.

***ELIMINATION** of inductive interference is accomplished by the metallicizing of grounded telephone circuits, but the circuits must be balanced through correctly placed transpositions if noise is to be avoided. Paper presented at convention of Wisconsin Locally Owned Telephone Group gives suggestions that have proved of value*

SINCE ARRIVAL of the REA and the greater extension of high-voltage power lines into rural territories, inductive interference has become an important matter to many small exchange companies and many farm line organizations. Today rural telephone companies, that have operated one-wire, grounded systems and provided satisfactory service, are suffering from the inductive interference problem, and the condition has worked serious hardships on companies that have not been financially able to rebuild grounded lines into metallic circuits.

Many schemes have been recommended to control the "noise" in telephone circuits involved in parallels with power wires.

In some cases repeating coils eliminated the trouble where the power line parallel was short. But this was not a "cure-all" for power lines were extended so rapidly that it finally became necessary to metallicize the entire line.

The Footville (Wis.) Telephone Co., with which I am associated, has approximately 100 local subscribers in the village and nearly 200 rural subscribers in a concentrated territory which does not extend more than seven miles in any direction from the central office. Every one of our rural lines being subjected to parallel power lines, it is practically impossible for us to operate anything but balanced metallic telephone circuits.

In most cases grounded telephone lines cannot be successfully operated if involved in more than a mile or so of high voltage power line parallels. Metallic lines, on the other hand, if properly built, transposed and maintained can be operated successfully, even in relatively long medium-voltage parallel. It seems to be a proved fact that the first step towards eliminating inductive interference is to make the telephone line fully metallic. No one has yet devised a substitute for this process.

A power line paralleling a metallic circuit telephone line will radiate energy to both of the telephone wires, and in most cases one wire will receive more of this energy than the other. However, we know that transpositions properly placed in metallic telephone circuits will balance the induced voltage on each wire so there will be no noise to interfere with telephone conversation.

In Fig. 1 is shown a power line paralleling a metallic telephone circuit. For example say that the telephone wire nearest to the power wires picks up eight volts and the other telephone wire picks up four volts. These voltages will immediately try to balance themselves between the two wires and the current will flow through each telephone instrument from the eight-volt side to the four-volt side.

The remedy for this situation is to cut an odd number of transpositions into the telephone line. The transpositions will permit each wire to pick up an equal amount of the radiated energy after which there is, of course, no tendency for this energy to try to seek its level by flowing through the telephone instruments on the line.

It has been found that the minimum of inductive interference will be experienced when both power and telephone lines are transposed. However, it is necessary that these transpositions be properly located with respect to each other, and this should always be considered when transposing telephone or power circuits.

On any telephone line we are likely to experience such troubles as grounds and high-resistance joints which may occur occasionally. Since in balancing a telephone line for quiet operation we do exactly the same thing that an experienced testboard man does with a Wheatstone bridge, we can make use of the principle of

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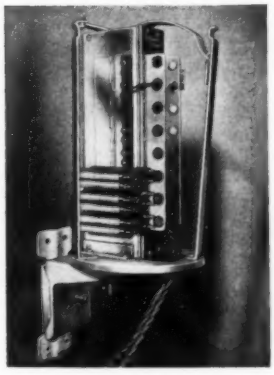
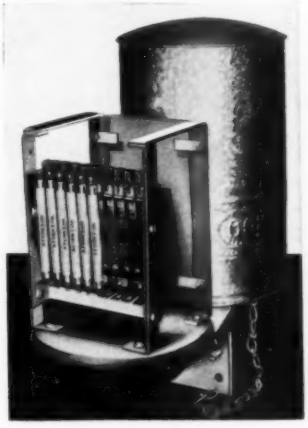
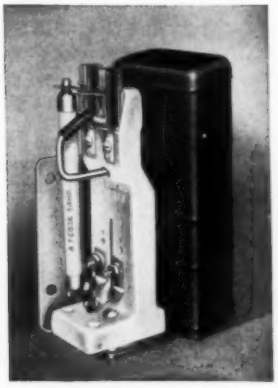


S-20 Protected Cable Terminal



Protected Outdoor Coil Mounting



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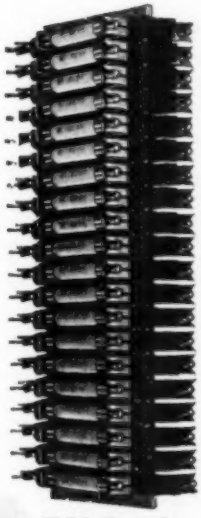

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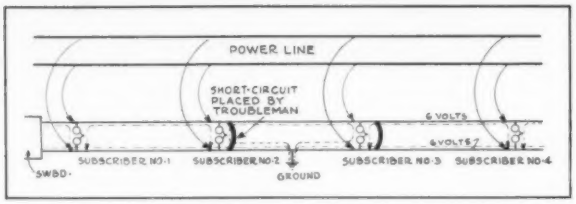


Fig. 3. Locating of a ground on rural telephone line without cutting line wires.

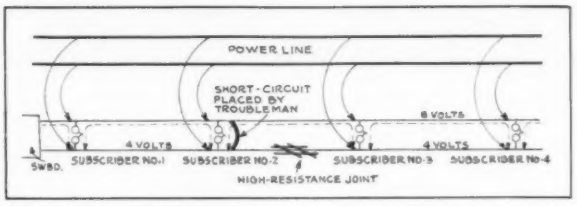


Fig. 4. Normally-balanced telephone line unbalanced due to high-resistance joint.

the bridge in locating grounds and high-resistance joints. As a matter of fact the balanced metallic telephone line is identical with the Wheatstone bridge.

Fig. 2 shows a balanced telephone line paralleling a power line. Both wires of the telephone circuit are short-circuited and grounded at the end of the line. This circuit represents the arms of a Wheatstone bridge and the telephone instruments on the line are comparable to the sensitive galvanometer of the bridge. The circuit, as illustrated, is balanced and quiet.

In Fig. 3 we have a normally-balanced rural line with a ground on it. This line has become quite noisy due to the unbalancing effect of the ground which is midway between the central office and the end of the line on one wire. The troubleman can make use of the Wheatstone bridge principle by making a test at the first or second telephone on the line.

With the operator at the central office listening he places a dead short-circuit across the line. If the operator reports the line quiet at that point, it indicates that the line is balanced from the test point to the central office. This same test may be repeated at another point farther out on the line and as soon as the operator hears any of the noise while the line is being short-circuited, the troubleman knows that he is beyond the trouble. In this way he can exactly locate the ground without cutting the line wires.

Fig. 4 illustrates a normally-balanced line which has become unbalanced due to a high-resistance joint. The same test method explained for locating the ground in Fig. 3 will enable the troubleman to locate the high-resistance joint.

In Fig. 5 is shown another simple test for locating high-resistance joints. In this example, before going out on the line one side of a repeating coil is bridged across the line and the center point of the coil is grounded. This coil will not interfere with the operation of the line while making the test.

As the windings on the repeating coil have a low resistance to direct current, an ordinary portable ohmmeter may be taken out on the line and both wires tested to ground back through the repeating coil. As long as an equal reading is obtained on both wires, we know that the high-resistance joint is farther out on the line. It is then a simple matter to locate the trouble without making individual tests of all splices on the line.

One of the most useful items in a small exchange is an ohmmeter mounted in a blank panel of the switchboard and wired as shown in Fig. 6 with two simple pushbutton keys to a test plug on the switchboard and a pair of test clips on the mainframe. Such a test circuit will give satisfactory service and remove much of the guesswork from trouble-shooting. The operator can easily learn to give valuable tests to the outside man and with her cooperation it is possible to reduce the time formerly spent searching the outside plant for troubles.

In the circuit illustrated in Fig. 6 the test plug when placed in a line jack gives a ground test on one side of the line. By pressing Key No. 1 the other side of the line may be tested for grounds. By pressing Key No. 2 the circuit is set up for a metallic circuit loop test.

▼ ▼

Plan Television Broadcasts of Republican Convention

Television will enter the political arena for the first time when the National Broadcasting Co. in June brings the Republican National Convention in Philadelphia, Pa., to televiewers in the states from Massachusetts to Pennsylvania. The NBC television audience is located in lower New York state, parts of Massachusetts, a large part of Connecticut, a corner of Pennsylvania and in New Jersey.

It is probable that the television station of the General Electric Co., Schenectady, N. Y., will relay some of the convention programs to the Albany-Troy-Schenectady area.

The television transmission from Philadelphia to New York will be made over the experimental coaxial cable installed some time ago by the Bell Telephone Laboratories, Inc., and the American Telephone & Telegraph Co. Although capable of transmitting several hundred telephone messages simultaneously the cable will handle only a single television program.

Fig. 5. Simple test for locating high-resistance joints in telephone line paralleled by power wires.

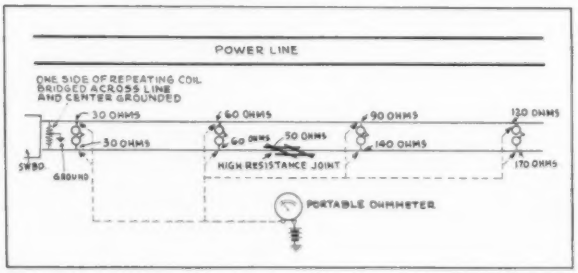
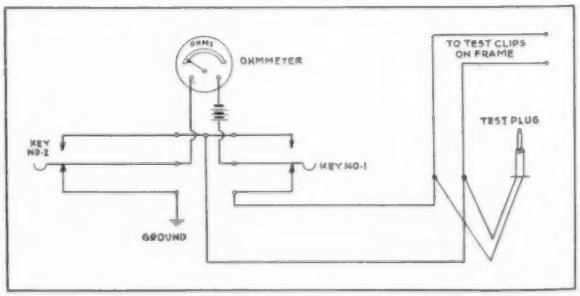


Fig. 6. Test circuit for small exchange.



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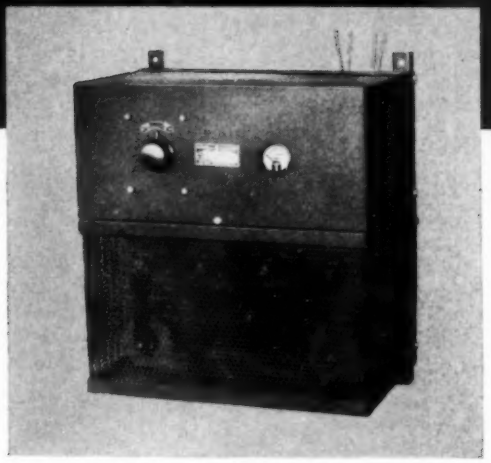

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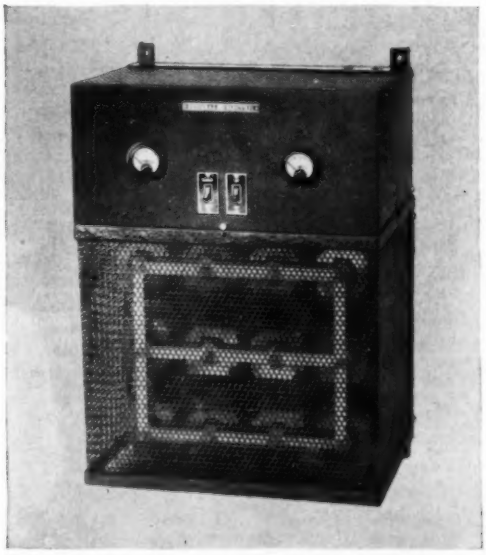

You want economical and efficient operation—
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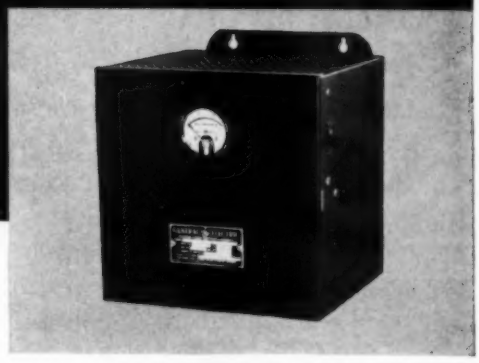

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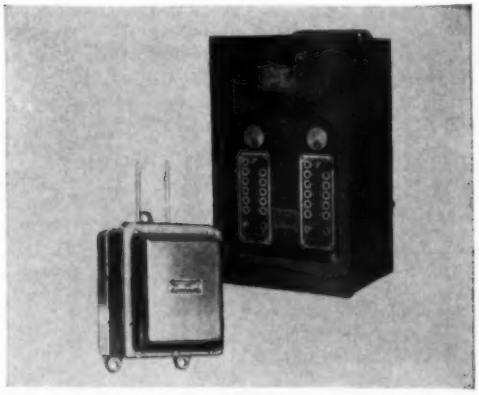

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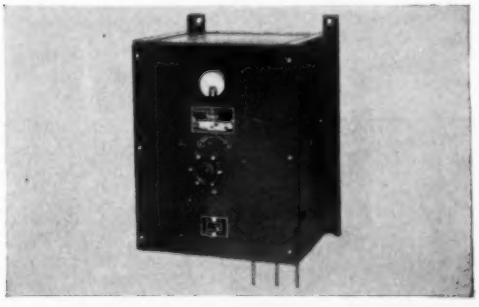

Write to Section A-0815, Appliance and Merchandise Dept., General Electric Company, Bridgeport, Connecticut.

GENERAL ELECTRIC

Information Sought and Found

At Keystone State Meeting

By RAY BLAIN

***PRACTICAL** and informative program at annual Pennsylvania convention meets approval of large attendance. "Here's how it's done" was basic idea of the various conferences and open forum which comprised program for two days of the three-day meeting*

These two members of the Pennsylvania Public Utility Commission were found in conversation during the convention last week: THOMAS C. BUCHANAN and JOHN SIGGINS, JR., chairman, both of Harrisburg.

Commercial committee photographed during Pennsylvania convention: Chairman, R. A. SMITH, vice-president and general manager, Blue Mountain Telephone Co., Bangor; LEW WHITING, vice-president and general manager, Meadville Telephone Co., Meadville, and JOHN K. STOLTZFUS, general manager, Conestoga Telephone Co., Birdsboro.

Surprised by the cameraman were J. H. SNYDER, of the Stromberg-Carlson company, and Equipment Engineer WILLIAMS, United Telephone Co., Harrisburg.

TELEPHONE people of Pennsylvania, armed with varying needs for information, marched on York May 16, 17 and 18 with the 38th annual convention of the Pennsylvania Independent Telephone Association as an objective. They laid down their arms only after all questions had been answered in a satisfactory manner. Some of these questions were disposed of by the speakers, and others in the various conferences, in the hotel lobby and by manufacturers' representatives in their exhibit booths.

The Pennsylvania convention is one of the largest and without a doubt, one of the best. It serves as a clearing house for difficult problems which may arise throughout the year. This is as it should be and it makes a state convention well worthwhile for all concerned.

The attendance at this year's meeting was the largest in years, total registration approximating 400.

The forenoon of the first day, May 16, was devoted to registration and visiting of exhibits; the afternoon was taken up with business affairs of the association and addresses by prominent speakers.

The first session of the accounting conference was held in the forenoon of the second day, May 17, and the afternoon was devoted to accounting and auditing sessions, commercial, plant and traffic conferences.

The annual banquet, entertainment and dance was held on the evening of May 17 with Harry J. Huether acting as toastmaster and Danny Morgan as song leader. The evening was thoroughly enjoyed by all.

The last day, May 18, was devoted to an open forum with many interesting subjects.

The opening session on the afternoon of May 16 was presided over by J. F. Stockwell of Philadelphia, vice-president of the association. After the invocation by Dr. Thomas S. Dickson, First Presbyterian Church, York, the following general remarks were made by Mr. Stockwell:

H. M. STEWART, executive secretary of Pennsylvania association, received many favorable comments on the organization's fine convention.

"There are approximately 200 Independent telephone companies, serving over 260,000 subscribers through some 520 exchanges, scattered over two-thirds of the geographical area of the state. The plant involved represents an investment of over 60 million dollars and develops a gross revenue of several million dollars. Much of the plant consists of the latest types of equipment, including the most modern manual and dial-operated equipment, and the world's largest all-relay dial operated exchange.

This association had its inception 38 years ago and now lists among its membership 90 per cent of the Independent stations in service within the state. Its membership also includes all of the leading Independent manufacturers supplying the industry."

President Delivers His Annual Address

In presenting his annual report President G. S. Herbert of Harrisburg, mentioned that two new mem-

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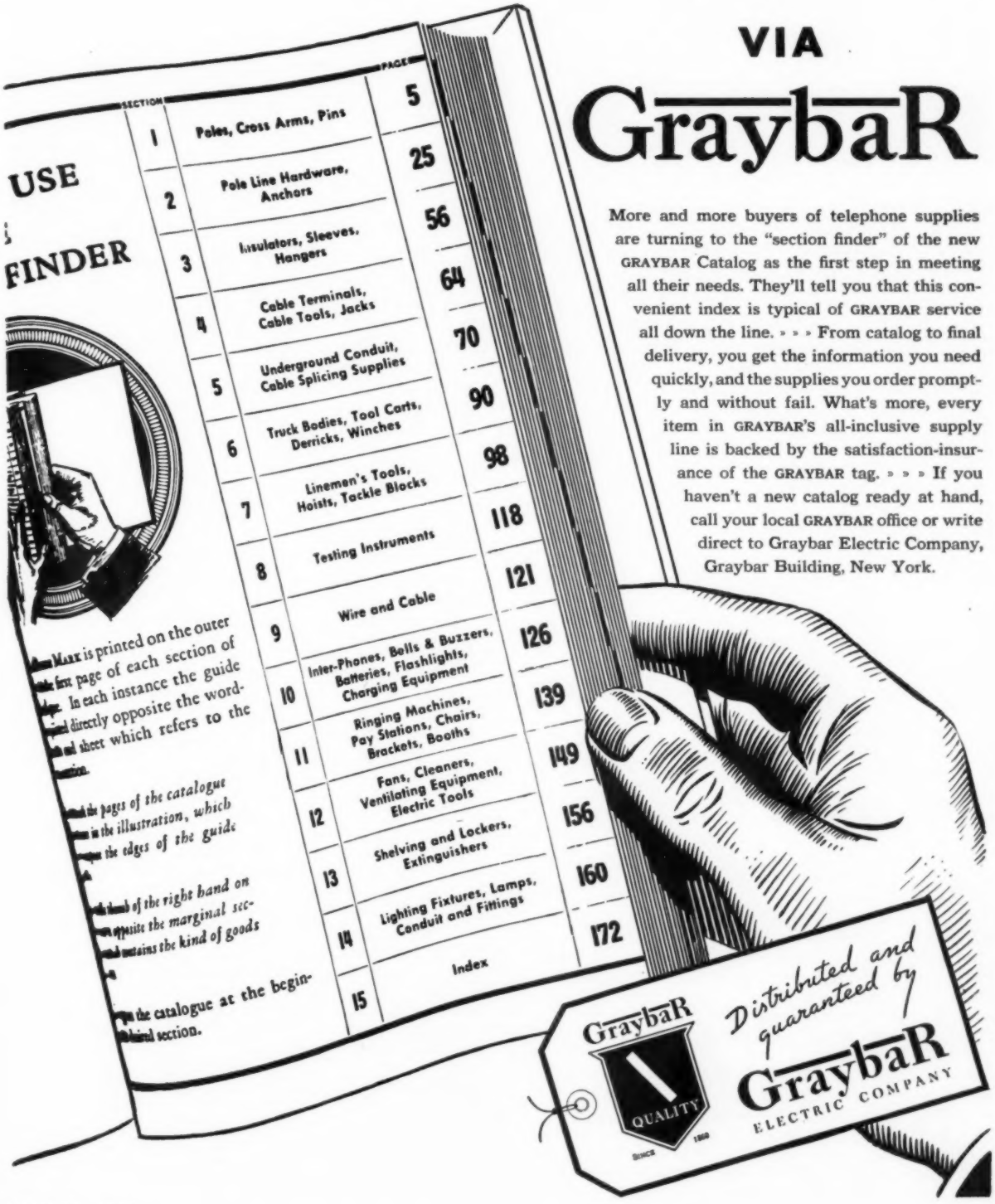
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Telephone people at the Pennsylvania convention never knew where Ray Blain would "pop up" with his camera. In this group are, left to right: (1) HARRY A. BLEISTINE, wire chief, and JOHN K. STOLTZFUS, general manager, of the Conestoga Telephone Co., Birdsboro, and HARRY R. MILLER, general manager, Bethel & Mt. Etna Telephone Co., Meyerstown; (fourth party unidentified). (2) JOHN H. WRIGHT, president, Peoples Telephone Corp., Butler; L. M. BERRY, president, L. M. Berry & Co., Dayton, Ohio; K. B. SCHOTTE, treasurer and general manager, Kittanning Telephone Co.; G. S. HERBERT, Harrisburg, president of the United Telephone Co. of Pennsylvania and of the Pennsylvania association; BEN SCHOTTE, plant superintendent, Kittanning Telephone Co., and DR. RAY H. MANSON, vice-president and general manager, Stromberg-Carlson Telephone Mfg. Co. (3) A. M. GIBSON, secretary and manager, Home Telephone Co. of Sheffield; WM. H. HARRISON, vice-president, A. T. & T. Co., New York City; JOHN SIGGINS, JR., chairman, Pennsylvania Public Utility Commission, Harrisburg; FRANK COX, vice-president, and J. A. FITZPATRICK, chief engineer, both of Bell Telephone Co. of Pennsylvania, Harrisburg; THOMAS C. BUCHANAN (back toward camera) member of Pennsylvania commission; GEORGE B. RUDY, president, York T. & T. Co., and W. D. GILLEN, assistant vice-president, Bell Telephone Co. of Pennsylvania, Philadelphia. (4) Accounting committee—WM. H. CUNNINGHAM, general auditor, Peoples Telephone Corp., Butler; HENRY RASHER, general auditor, United Telephone Co., Harrisburg; HAROLD C. WHITE, general auditor, Jamestown (N. Y.) Telephone Corp.; E. H. DILLON, general auditor, Pennsylvania Telephone Corp., Erie. (5) PHIL STAPLES, president of the Bell Telephone Co. of Pennsylvania; LOUIS PITCHER, executive vice-president of U. S. association; G. S. HERBERT, of Harrisburg, and WM. H. HARRISON, vice-president of A. T. & T. Co. (6) Exhibit of Copperweld Steel Co., with VIC CURTIS on right. (7) National Carbon Co. exhibit. (8) Display of Electric Storage Battery Co. (9) In booth of the National Telephone Supply Co. are shown (sitting) ROBERT H. WELF, special sales representative, (center) STEWART WRIGHT, general sales manager, and TED DALLY, New York.

bers have been added to the board of directors, Claude Bennett of Wellsboro, and Ames E. Brown of West Springfield, to fill the vacancies created by the resignations of J. C. Scott and A. M. Gibson.

Membership in the association continues to grow, several new members being added last year which included two toll clearing accounts. Forty-four companies now report inter-company toll receipts to the state association for clearing purposes. A substantial reduction in the rate of compensation charged active members for toll clearing work was made last year.

Mr. Herbert referred to the association's fine cooperation in the wage-hour fight for an amendment to the act, and to the increasing amount of services rendered by the association to member companies. "Many new and revised tariffs have been drafted and filed, including several containing substantial rate increases," said he. "A new tariff, revised to meet more fully and adequately the requirements of the Federal Communications Commission, has been drafted and filed. A similar revision of our tariff governing intrastate toll rates is now under way.

"Your association has been helpful to its class A and B members in developing continuing property records pursuant to the commission's order requiring the adoption of such records. . . . We thank the Jamestown Telephone Corp., of Jamestown, for the time and money it has spent in behalf of the association and in explaining its system to our individual members. This experience and counsel have been invaluable.

The porcelain-finished signs, developed at the suggestion of K. B. Schotte, Kittanning, continue to be popular. We have recently shipped the largest single order yet received, to a company in the Middle West, and sizable shipments have gone as far south as Alabama and Florida. These out-of-state orders came as a result of a picture of the exhibit at last year's convention which appeared in TELEPHONY.

A new plant or code handbook, made possible through the courtesy of one of our members, has met with ready acceptance."

Mr. Herbert stated a far-reaching decision of interest to telephone people, handed down by the Pennsylvania commission, concerns the practice of telephone companies to maintain control of the equipment and apparatus used in manufacturing and distributing service. Failure of the commission to find suitable reasons on which to base an

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have tough outer braid with the finest moisture proofing assuring long life and trouble-free service.
Economize During 1940 with Lenz
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LENZ ELECTRIC MANUFACTURING COMPANY
1751 N. WESTERN AVE., CHICAGO, ILLINOIS, U. S. A.
"IN BUSINESS SINCE 1904"

SOLIDS-LIQUIDS-GASES-SOLIDS-LIQUIDS-GASES-SOLIDS-LIQUIDS-GASES

DRIERITE

The Modern

DESICCANT

for

DRYING CABLE SPLICES

DRIERITE dries the Cable Splice by positive absorption of all moisture from wires, insulation, bandage and surfaces inside the sleeve. Application is easy and rapid.

The snow-white granular DESICCANT is neither poisonous, corrosive nor abrasive, and does not evolve gas, fume or odor either in storage or in use. It eliminates all chance of fire, accident or discomfort to workmen or occupants of buildings.

STANDARD PACKAGES
1/8 Pint Can (50 Grams), 48 per Carton. 1/2 Pint Can (200 Grams), 12 per Carton. 1 Quart Can (800 Grams), 12 per Carton.

Manufactured by

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YELLOW SPRINGS, OHIO

SUB-CYCLE

The MASTER Ringing Converter

Model "S"

PRICE $45.00

Five Models 20 or 50 Watts Output
ALSO PULSATO®S
Prices $45.00 to $113.50

PRECISION-BUILT TO INSURE A PERFECT PRODUCT

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NO MOVING PARTS
NO VIBRATING CONTACTS
NO ROUTINE MAINTENANCE
NO RADIO INTERFERENCE

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For Dial Type Offices
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LORAIN PRODUCTS CORPORATION, Lorain, Ohio
Sold by Leading Distributors
Address Foreign SUB-CYCLE Inquiries to Automatic Electric Sales Co., Ltd., Chicago, Ill.

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order requiring a telephone company to connect with subscriber-owned equipment confirms the soundness of the telephone company's practice.

Reference was made to the commission order, sustained by the courts, which reduced the Bell company's intrastate toll rates beyond a certain distance (TELEPHONY, February 3, page 32). Another recent decision which interested Pennsylvania Independent companies was that of the Jamestown (N. Y.) Telephone Corp. (TELEPHONY, March 30, page 9).

Excerpts from President Herbert's address relative to present Pennsylvania conditions and future possibilities will be published in next week's issue of TELEPHONY.

John Siggins, Jr., chairman of the Pennsylvania Public Utility Commission, Harrisburg, in presenting an address stated that the commission has watched the telephone industry expand and that its development has been wonderful due to the research of the telephone laboratories.

However, regulations covering the use of the telephone are necessary, he said. He pointed out that the members of the commission are operating as private citizens and interested only in public service. It is necessary to see that the telephone companies do not get too much or too little for their service.

Handling of power is one of the hardest jobs in the world, and it is difficult to maintain a proper equilibrium at all times. It is not the desire of the commission to hurt anyone on either side or to permit advantages to either. True cooperation between the commission and utility companies is necessary.

With reference to original costs reports, Mr. Siggins stated that they are necessary in order to arrive at a fair value for the purpose of accounting. There is a tendency on the part of the telephone company to give "any kind of an answer" to the commission, it was stated.

Mr. Siggins declared that when any questions come up as to original costs, the commission would much prefer to have the telephone company or its representative call on it. Then someone who understands in detail all phases of the question in which the company is involved will be assigned to answer them.

The day-to-day operations in the telephone business and how to make service more dependable formed the basis for an interesting address by W. H. Harrison, vice-president and chief engineer of the American Telephone & Telegraph Co., New York City, and a former operating vice-president of the Pennsylvania Bell.

A More Complete Telephone Service for Subscribers

"All telephone people, whether they carry on under the banner of the Independent or the Bell, have a strong bond of common responsibility," said Mr. Harrison. "We have a joint job to do and, on the whole, the record reflects that a good job is being done. It is significant, too, that the value of the services gets progressively greater. Each group makes a measurable contribution to this good over-all result.

"The business we represent is part and parcel of the American way of living, in which life, contrasted with the ways of other days, is much fuller, more exciting, more hazardous and, in many respects, more exacting.

"While some of us who work at the job of serving the public enjoy many things for which we are all grateful—and I can't imagine any job more fascinating, day in and day out, than the telephone job—yet the very fascination of it makes for obligations and responsibilities that challenge to the full our ability and our capacity for imagination. Let's consider these responsibilities:

(1) The necessity of ever improving the quality of service.

(2) The responsibility to develop the market, increase usage, and broaden the scope of service.

(3) Our obligation toward our fellow-workers in maintaining continuity and satisfactory conditions of employment. Fundamental in this is the obligation to develop the market and hence provide maximum opportunity for employment.

(4) Our trusteeship toward the ratepayer, and toward the investor who provides the money for operating and for building the telephone plant.

(5) The need to look ahead and prepare to meet the constantly-changing and more exacting conditions of the future."

Mr. Harrison confined most of his remarks to the necessity of making telephone service more dependable, a responsibility which affects Independent and Bell alike. He briefly reviewed how communication was accomplished in the early days and the length of time consumed, in comparison with the telephone and other scientific discoveries and inventions of the modern day.

"With distance no longer a barrier, world-wide telephony is a re-

Dillon

Dynamometers Temperometers

Anchors

Tensile-Strength Testing Machines

★ **The Dynamometer** to tell you exactly the tensions applied to wire, messenger and guy strand and thereby prevent devitalization and overstrain which basically cause later breakdowns. Also to tell you whether or not your anchors, as installed, will hold the load required. Available in two models with capacities of from 500 to 1000 pounds and from 2500 to 15,000 pounds. The lighter model so small it will fit in your coat pocket and the larger model, weighing but 6 pounds, only 7½" overall. Priced so low you can't afford to be without one. Guaranteed accuracy.

The Anchor to give you maximum holding power—Greater blade spread in undisturbed earth (80% of the Dillon Anchor extends into undisturbed earth) and lower installation costs due to the smaller opening required. Scientifically engineered, this anchor is the outstanding improvement in anchor history.

The Temperometer to give you correct temperature readings of wiping solder, waxes, compounds, etc. No more porous or crystalized cable joints or injuries to cable insulation. Use the Temperometer to get correctly heated materials. Inexpensive, efficient and Fully Guaranteed.

The Tensile-Strength Testing Machine used in conjunction with our Dynamometer for Laboratory work. Tensions up to 25,000 pounds developed in the matter of seconds under hand operation. Gripping jaws are custom built to accommodate practically any specified product or material. Sturdily built, portable and requiring very little floor space.

W. C. DILLON & CO., INC.

185 North Wabash Avenue Chicago, Ill.

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FOR USE UNDERGROUND

ORANGEBURG *the new Dual Economy*

NOCRETE CONDUIT

USED WITHOUT CONCRETE ENCASEMENT

1. *Strength:* Far in excess of any fibre conduit produced heretofore.
2. *Permanence:* Immune to soil corrosion and electrolysis.
3. *Cable Protection:* Proved by 45 years of use.
4. *Dual Economy:* Priced at substantial savings over metal pipe; installed at less cost.

Suggested for service entrances, extensions, suburban distribution, laterals, etc.

USED WITH CONCRETE ENCASEMENT

ORANGEBURG STANDARD CONDUIT

For the ultimate economy of complete cable protection in even the most hazardous locations. Recommended for main distribution, duct bank and "downtown" construction.

Send for new Catalog 45T with helpful tables and underground construction data.

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Years of experience in investment banking, including assistance to both large and small Independent telephone companies in their financing problems, enable us to bring unbiased advice and skilled cooperation to your aid.

We have been helpful to well managed companies both in reducing the interest rates paid on their obligations and in raising money for new construction and expansion programs. There is no cost or obligation involved for a conference with one of our representatives.

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MAKES POSSIBLE LONGER SPANS

CONSIDERED solely on the basis of economy, Amertel 85 and 135 Telephone and Telegraph Wires offer you attractive savings. Their greater tensile strength permits longer spans.

Think what these longer spans mean to you. Less investment in outside plant. Faster completion of a given line. Greater protection against failures due to ice and wind loads. You can't afford to overlook these advantages.

To insure long life, Amertel wires are protected by our "True-Bonded" galvanizing process, which results in a controlled layer of zinc-iron alloy between the pure zinc and the steel base. This provides a tighter bond that resists cracking or peeling.

Amertel is available also in "EBB," "BB," and "Steel" grades. Write today for complete technical data.

Look for this tag. It is placed on every coil of Amertel Telephone and Telegraph Wire for your protection.

AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*

United States Steel Export Company, New York

UNITED STATES STEEL

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ality," said he. "Switching and signaling systems give almost immediate connection at any distance with errors under 1 per cent, even in the complex calls of modern metropolitan areas. Instruments and line networks for transmission give a voice reproduction so faithful that it exceeds standards heretofore never thought possible."

"All of this leads people to depend more and more upon telephone service and places a new emphasis upon the continuity of service," declared the speaker. He then mentioned the floods in Pennsylvania which have in the past caused great human suffering and anguish, and disrupted telephone service. Independent and Bell suffered alike.

"Telephone men were not content with simply restoring telephone service," Mr. Harrison continued, "but turned their efforts to restoration in such a way as to avoid a future recurrence of the same thing. When floods came this spring, little damage was done and no toll lines were thrown out of service."

"Nature seldom hits twice in the same place, in the same way. But one thing we may be sure of—she will strike again and strike hard. Next time it may be a sleet storm . . . or a hurricane. . . . We must meet this challenge by continued pressure on the problem of doing everything that is humanly possible, within the limits of reasonable expense, to increase the dependability of our service in these times of emergency, as well as during everyday operation.

In these problems, Independent and Bell people continue to work together with a common aim, and with the common bond which comes from that common aim. We recognize we are in a joint enterprise, to give an ever-improving and ever-expanding service, and to measure up fully to the responsibilities which that entails."

National Affairs and the National Association

In an address by Louis Pitcher, executive vice-president, United States Independent Telephone Association, explanations were given of recent rulings made in connection with the Wage-Hour Act. "We are not satisfied with the ruling in regard to learner operators and have asked for a revision," said Mr. Pitcher.

He stated that while an attempt had been made to get a 1,000-station exemption and had obtained only 500 stations, he still considers "that we have gained approximately 93 per cent of our objectives." The telephone industry is the only one to succeed of the many who tried to obtain an amendment to the Wage and Hour Act.

A fight has been waged against the complexity of reports and an effort made to simplify those rendered the Federal Communications Commission, chief among these being the continuous property record. The American Telephone & Telegraph Co. has prepared what it considers a proper form but which the association believes is entirely too complicated.

Mr. Pitcher referred to the "credit cards" of the A. T. & T. Co. which are to be used in the same manner in making telephone calls as similar cards are used for the purchase of gasoline.

These snapshots taken at the Pennsylvania convention by Cameraman Ray Blain picture the following: (1) LESTER R. THURSTON, commercial and traffic manager, United Telephone Co., Harrisburg, who presided at traffic conference as chairman. (2) DANIEL SEITZ, cable superintendent, York Telephone & Telegraph Co., York, is shown presiding at the plant conference as its chairman. (3) ETHEL M. CUNNINGHAM, secretary and office manager of the Pennsylvania association. (4) H. G. SUPPERS of John A. Roebling's Sons Co. is shown with some of the equipment used by him in demonstration before plant conference. (5) Explaining in the plant conference how cable is manufactured. (6) Chart on advertising used in commercial conference.

Conferences Held on Accounting and Auditing

The accounting and auditing conference got off to a good start Friday morning, May 17, under the able direction of E. H. Dillon, chairman. A new plan was inaugurated this year in that the conference was divided into five groups with the following group leaders and suggested subjects for discussion:

WM. H. CUNNINGHAM, auditor, Peoples Telephone Corp., Butler: (1) "Present Status of C Accounting Systems," and (2) "Simplified Depreciation Accounting for Small Companies."

E. H. DILLON, auditor, Pennsylvania Telephone Corp., Erie: (1) "Clearing Accounts and Distribution Methods," and (2) "Budgets."

HENRY RASHER, general auditor, United Telephone Co. of Pennsylvania, Harrisburg: (1) "Problems in Connection with Telephone Plant Acquisition Adjustment (Account 100-4)," and (2) "Point Pole Problems."

A. D. SHAMBERG, comptroller, York Telephone & Telegraph Co., York: (1) "Treatment of Contribution of Telephone Plant, Reimbursement for Plant Relocations, etc.," and (2) "Preparation of Information During the Year for Regulatory Body Reports."

H. C. WHITE, auditor, Meadville Telephone Co., Meadville: (1) "Continuing Property Records and Procedures," (2) "Work Order Procedures," and (3) "Material and Supplies Control."

The theory of this new plan is that persons in a small group will feel freer to discuss their various problems than they would in a larger group. All indications are that this arrangement proved most satisfac-

tory. Next year it is planned to send out questionnaires in advance of the conference in order that the various questions may be considered and indexed for discussion.

Although an attempt was made to discuss the suggested subjects, it was not long until all groups were discussing the continuing property record which apparently is uppermost in the minds of all. Numerous ideas were disclosed which would tend to clarify this perplexing subject.

Commercial Conference Studies Complaints and Advertising

The commercial conference, under the direction of R. A. Smith, chairman, was well attended. The reception and treatment of subscriber's complaints was discussed in detail. It was suggested that all complaints received be recorded on suitable forms to be analyzed at the end of each month. If 50 per cent of 200, or even 2,000, complaints received indicated dissatisfaction with some existing ruling or phase of operation, the elimination or revision of that particular ruling should be considered.

It was decided that tactful and proper treatment of complaints would prove of considerable help in the promotion of better public relations.

It was generally agreed that some form of advertising is necessary for any successful telephone company. While various methods of advertising might be used, it was stressed that whatever the program it should be consistent. The money to be expended by any company for advertising should be budgeted quarterly, and at that time the methods to be used should be decided upon.

One form of advertising suggested is through local newspapers, daily or weekly. It was pointed out that while no direct results might be obtained through this method, considerable benefit would accrue to the telephone company due to the promotion of better public relations.

The use of bill inserts was discussed. It was the opinion that best results from this method would be obtained if the inserts were used periodically, preferably around directory time. Advertising on the backs of bills was also suggested as a method of free advertising. Advertising in connection with the installation of new stations and also extension telephones on existing stations was recommended.

Contact with real estate and electric light people was proposed as a means of keeping a check on new people moving into a new territory. It was also proposed that regular customers be requested to send in lists of names of people known to be without telephones, or who may be bothering them by the use of their own telephones.

Operators often furnish valuable leads in reporting lines which are busy frequently. Such people reported are often sold on having a private line or at least four-party. Other employes may also furnish valuable information as a basis for obtaining new subscribers.

Cable Demonstrations Given in Plant Conference

The plant conference under the direction of Chairman Daniel Seitz, cable superintendent of the York Telephone & Telegraph Co., was one of the best attended state plant conferences that have been held recently.

John C. Hull, supervisor of the line and cable department, Keystone Telephone Co. of Philadelphia, gave a demonstration and discussion of locating split cable pairs, and of other cable trouble-locating methods. Employes of the York Telephone & Telegraph Co., York, presented a demonstration and discussion of locating open cable pairs.

A length of cable was suspended at one end of the room on which various types of faults had been placed at different locations. The methods by which these faults may be located were demonstrated by the use of various types of testing equipment. One particularly interesting method was used in the location of wet faults where a leakage of not over ten volts was indicated.

These faults, while not ordinarily easily located by use of a bridge, were localized in this demonstration by connecting a 45-volt radio "B" battery in series with a receiver across the faulty cable pair and then tapping the cable along its length with the handle of a hammer. No noise would be heard in the receiver until the tapping had reached a point near the fault which increased in loudness in the fault and then slowly diminished as the fault was passed.

This method, while extremely simple, attracted much attention due to the ease with which it may be used to locate difficult cases of trouble in any telephone exchange.

An interesting demonstration on cable manufacture and various cable-

"STANDARDIZE DEAD-END TIES"
Reliable
DROP WIRE CLAMPS
• The type "P" drop wire clamp is an ideal device for attaching No. 17 B&S twisted pair or parallel drop wire to poles and buildings. It prolongs the life of the drop wire, permits free swinging at the tie, places all of the wear on the hardware and eliminates the sharp bends necessary with other methods.
This clamp is easily and quickly installed, making a very neat installation. Slack in drop wires can be taken up quickly without leaving any weak spots on the wire. Write for samples.
Reliable
ELECTRIC COMPANY
OVER 25 YEARS SERVICE TO THE UTILITIES

testing methods was conducted with the use of laboratory instruments by H. G. Suppers of the John A. Roebling's Sons Co., Trenton, N. J.

Dale T. Winner, engineer of the Peoples Telephone Corp., Butler, headed a discussion of new high-gain station equipment.

Ray Blain, telephone engineer and writer, conducted the open forum which closed the plant conference. Subjects discussed included lead-tin-arsenic, wiping solder, desiccant method of cable drying, lashed method of cable suspension, long-span construction and its maintenance costs, and new developments in the telephone field.

Traffic People Overflow Conference Room

The traffic conference under the direction of L. R. Thurston, chairman, was especially well attended. The room assigned for this conference overflowed and it was necessary to move to larger quarters.

The Bell credit card was discussed with considerable interest. The importance of obtaining the serial number, name and address of the individual making the call was stressed. It was pointed out that on calls originated by an Independent company and charged against one of these cards, should the call prove uncollectible the Independent company must stand the loss.

The method of handling conference calls was discussed in detail. It was agreed that special rates governing such calls are reasonable and that their use is on the increase. It was pointed out that suitable equipment is not always available at the Independent exchange for the proper handling of conference calls. One conference call of interest was cited in which several sons located in various sections of the country talked to their mother on the occasion of her birthday.

The proper handling of contract calls whereby a subscriber may contract to utilize the toll circuit for a specified time and at stated intervals was discussed. The necessity of preventing a line under contract from being tied up with incoming calls during the contract period was pointed out. It was stated that a subscriber having the contract service may originate a call prior to the contract period if he so desires as, in that case, the responsibility rests with him and not with the company.

The subject of teaching and training new operators was discussed. For best results, the student should have ample time to become acquainted with what is going on around her and the different operations should be explained carefully to her. It is a good idea to let the student watch the operators at work for a period of time.

The chief operator should spend as much time with the student during the first few days as is practicable. First, she should be taught the difference between a person-to-person call and a station-to-station call. Later, the student should handle a few of the office calls, and gradually work into actual operating. The best results, it was agreed, may be obtained by teaching a little at a time rather than confusing the student with too much detail.

The closing session on Saturday morning, May 18, consisted of an open forum discussion of joint pole line agreements, public utility commission rulings, the Wage-Hour law, and numerous other problems.

Various resolutions were drawn up during the convention by the resolutions committee which was composed of Bertha Brossman, Gordon Evert and R. F. McKelvy. One resolution incorporated appreciation for the guidance and leadership of John H. Wright who has now retired as president of the association. Other resolutions paid tribute to the following telephone men who passed away during the year: Harrison F. Gingenbach, William S. Paca, Edwin D. Schade, Frank M. Opp, and James N. Scott.

The officers of the association, who were elected at the regular board meeting last January, are as follows: President, G. S. Herbert, Harrisburg; vice-presidents, J. F. Stockwell of Philadelphia and H. M. Engh of Erie; executive secretary, H. M. Stewart, Harrisburg; secretary, Miss M. E. Cunningham, Harrisburg, and treasurer, Geo. B. Rudy, Jr., York.

Nebraska Commission Chairman Defeated in Primary

S. A. Swanson, a former star football player for the University of Nebraska, was nominated for commissioner of the Nebraska State Railway Commission on the democratic ticket instead of Will M. Maupin, chairman, who has served for the past five and one-half years. The unofficial returns gave Mr. Maupin the nomination, but the official count gave it to Mr. Swanson. (TELEPHONY, May 11, page 18.)

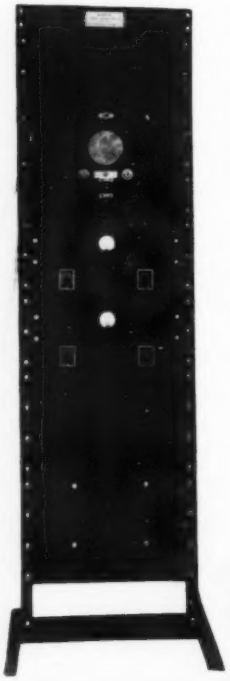
Include

HARDING TELEPHONE REPEATERS IN YOUR BUDGET

INDEPENDENTS: Use the patented Transmission-Booster in your cord-circuits instead of changing from Iron to Copper. 15 decibels gain in toll-toll or toll-local connections. Automatic operation. No balancing nets required. Self-compensating.

The patented self-compensating two-way Repeater gives satisfaction in those fluctuating lines. No "wet nurses" required. High gain. The patented Booster-AVC Speaker displaces the repeater and gives the dispatcher an AVC Speaker, at Intermediate locations.

Our patented Automatic Modulation Control, or Limiting Amplifier, assures 100% modulation without distortion in broadcasts and in combination line and radio service.



HARDING TELEPHONE REPEATERS

INDIANAPOLIS, INDIANA

THE BUSINESS END

(Concluded from page 31)

tion should have a meeting at least each month at which time the board should be shown the exact financial condition of the company at the end of the previous month. This board should know how many telephones were removed from service during the previous month and the reasons for the loss of each station; how many telephones were installed and the exact amount of income that is expected to be earned during the coming month. This board of directors should check over any delinquent list of subscribers and indicate to the proper employe what should be done in each case in order to comply with the collection rules under which the company operates.

The cases of trouble occurring during the preceding month should be checked and a showing of their clearance made. The board should know all about the business of its company and the minutes of each board meeting should show how much these directors know about the business.

Perhaps, sometime, some one will write a book of instructions for boards of directors of small telephone companies which would indicate just what to do whenever certain conditions arise. Occasionally some employe of a small telephone company is energetic enough to carry the progress of the company forward without the directors leading. But, as a basic fact, the board of directors is fully responsible for the company in every phase of its operations.

▼ ▼

Scientists Told of Communications Among Americas

Facilities for rapid communication between North and South America must be encouraged and extended as a defense measure, Major Gen. James G. Harbord, chairman of the board of the Radio Corp. of America, told the eighth American Scientific Congress in Washington, D. C., on May 15.

"At a time such as this, it is impossible to exaggerate the importance of the role played by the facilities for rapid communication between all parts of North and South America," he said. "That role is no longer confined to the promotion of commerce and friendly social contacts."

Engineers are working on a television relay system to follow the Pan American Highway so that "we may see as well as hear one another with the speed of light," he said.

"Certainly the motives of this country are no longer distrusted by our neighbors to the south. In bringing us closer together, the efforts of the American communications companies to provide service of the highest quality have unquestionably been a contributing factor."

Frank W. Phelan, president of All America Cables & Radio, Inc., traced the rapid development of communications in the Americas, and recalled the pioneer interest with which the telephone was greeted in South America. The first telephone concession was granted in Peru in 1888, the other South American countries were not slow to follow.

In discussing telephone service, Mr. Phelan referred to the International Telephone & Telegraph Corp., which has telephone properties in Puerto Rico, Cuba, Mexico, Brazil, Chile, the Argentine and Peru. Two other United States companies have played an important role in developing international telephone service in the American republics, he continued.

The Associated Telephone & Telegraph Co. purchased control of the principal telephone systems in Colombia and the Dominican Republic and arranged for their connection with the world telephone network. Radiotelephone service with North America was opened by Colombia in 1932 and by the Dominican Republic in 1935.

The Tropical Radio Telegraph Co. connects the republics of Central America with the rest of the world through radiotelephone stations in Costa Rica, Guatemala, Honduras, Nicaragua and Panama. It operates with the A. T. & T. station at Miami, Fla., established in 1933 to serve the Caribbean region. Puerto Rico is connected through Miami by the I. T. & T. Corp.'s company in Puerto Rico and telephone service has been established between Puerto Rico and the Dominican Republic and Haiti.

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Ohio Bell Seeks Franchise Tax Refund

The Ohio Bell Telephone Co. has filed application with William S. Evatt, state tax commissioner for a refund of $58,950, alleged by the company to have been improperly levied as franchise taxes upon a refund of $4,470,437 which was held as excessive charges to subscribers from 1925 to 1932.

The refund paid by the company to subscribers was ordered by the Ohio Public Utilities Commission April 26, 1938, and included 6 per cent interest compounded which brought the total refund up to $7,500,000.

TYPE 40 PROTECTED TERMINAL

Protection, if you need it, should be complete—the kind you get with the Type 2105 Discharge Block. This block is standard on Type 40 Terminals. It guards unfailingly against all high potentials, because it grounds heavy currents automatically. It resets itself after discharge, too—a feature that slices welcome dollars off your maintenance budget.

Prove it to yourself. Specify SANDS next time.

TYPE 40 SPECIFICATIONS

For 3, 5, or 7 pair cable. Galvanized cast iron frame. Two 5 amp. Type 17 fuses, two Type 2105 discharge blocks. With or without six foot, 22 gauge cable stub.

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RAY-O-VAC COMPANY
Formerly FRENCH BATTERY CO.
MADISON · WISCONSIN

LONG-SPAN CONSTRUCTION

(Concluded from page 29)

use a regular block and tackle with parallel jaw grips. This takes the pulling strength of a good man on the ground.

The Tie Wire in Long-Span Work

The tire wire for tying the high-strength wire to the insulator is very important. The tie wire should be of soft E.B.B. wire. Up to this time no manufacturer of extra high-strength wire has developed or recommended a tie wire which I consider satisfactory. In view of this I have developed a tie which I think is very good. It is of soft iron wire, No. 12 gauge E.B.B. grade, 32 inches long.

Formed in a U-shape the tie is placed over the wire and around the insulator, each end making a complete turn around the insulator under the line wire on the opposite side from where each end was started. It is then twisted around the side of the line wire where the tie was started, each end being drawn up slightly with a pliers.

This tie is easy to put on and can be taken off without a pliers. The tie eliminates damage to the tie or the line wire from vibration. The only place where the tie wire meets the line wire is at one point, the contact between the line wire and the insulator where there is no vibration. The tie has two full turns around the insulator and the line wire lays snugly in the tie. Often lines have to be moved, and then is when we appreciate a tie that can be put on and taken off easily and quickly.

Guying of the long-span line is important as it is in any type of line construction. Long-spans having greater strains on the corners than ordinary construction, the anchors must be placed a little deeper and in some cases farther from the pole. Messenger strand is to be preferred for this type of construction instead of the guy wire often used for the usual construction.

The poles for long-span construction have to be set a little deeper than for B.B. wire construction. A 20-foot pole should be set 4½ feet deep and a 25-foot pole, five feet deep.

On a line .58 mile in length, serving one subscriber, we used only six poles, the spans being 763 feet, 672, 492, 342, 491 and 311. The cost of this line was $70.70 or $122 per mile which compares with $189.60 per mile for usual construction. It is a saving of $67.60 per mile for a two-wire line or 35 per cent.

475-foot span of new high tensile line wire in light loading district. A small angle pole is in foreground. Brackets, reinforced with two or three-wire wraps, are mounted on same side of pole away from direction of the pull. Next pole is that visible farthest to right.

On a 600-foot span going diagonally over a highway, we used 20-foot poles and had a clearance of 18 feet over the highway. If construction with B.B. wire had been used, two 30-foot poles and one 25-foot pole would have been required to obtain the necessary clearance over the highway.

With the higher strength wire supplied by the manufacturers we have been able to make longer spans in rural lines up to eight wires. This has resulted in a saving from 25 to 35 per cent in the cost of the line with easier building, maintaining and moving of the lines when necessary. Therefore, I recommend you to construct one or two miles of long-span line with the extra high-strength wire. By doing that you will experience advantages of this type of line which are unknown to you at the present time.

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South Carolina Wants Federal Rural Telephones

South Carolina wants federal aid in building rural telephone lines. The general assembly on May 9 adopted a resolution requesting South Carolina members of Congress to use their influence in obtaining federal grants for that purpose.

The resolution passed both houses of the general assembly without debate. The purpose in seeking federal money is to make it "possible for South Carolina to set up a system of rural telephones and modern water supply systems for the rural homes of South Carolina."

XUM

HOW TO MEET THE REA PROBLEM

(Concluded from page 27)

and partly through capacity coupling, but it will be enough so that the telephone line will carry a charge of alternating current with a voltage potential to ground ranging from 50 to 100 volts.

This charge, if the line is properly transposed and well-insulated, is spread evenly over both wires of the entire line and will not produce noise. But let one wire come into contact with even a small, juicy branch of a tree!

Then the charge in that wire will start arcing to the tree, seeking a path to ground; and the charge in the opposite wire will start flowing through the telephones, also seeking ground, thereby producing a noise on the line which may be severe enough to render the line of no value so far as the transmission of speech is concerned.

To overcome this condition, it is quite evident that a type of construction must be provided that will keep lines perfectly balanced throughout their entire length and positively free from tree or other grounds. Where exposures to power lines only affect a very small portion of a line, it is possible to reduce interference somewhat by metallicizing only the portion of the telephone line affected and installing repeating coils between the metallic and grounded portions of the line.

However, in view of the fact that REA lines will eventually cover practically every community that has telephones—and when it is taken into consideration that the metallic line provides a much better grade of service—the cases where such a procedure would be advisable may be considered as rare.

In conclusion attention is directed to the advantage that may be gained by doing a good construction job. The resultant saving in maintenance will more than offset any reasonable construction expenditures, and satisfied subscribers are always evidence that there has been an improvement in the grade of service furnished.

While the work is in progress, as well as after you have completed a good job of metallicizing, do not forget to keep the public informed. A little suitable publicity sprinkled in, referring to the job, will prove very helpful.

The accompanying illustration is a copy of one of the folders that was mailed to our subscribers after our plant had been converted to full metallic and an adjustment had been made in service charges.

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Communication Symposium at Massachusetts "Tech"

A national symposium on "Channels of World News and Opinion," a subject which in the present disturbed state of international affairs is expected to be of significant interest, will be held at the Massachusetts Institute of Technology in Cambridge on June 3. Supplementing the symposium will be a comprehensive technical exhibition of various modern communication equipment.

The presiding officer will be Dr. Frank B. Jewett, president of the Bell Telephone Laboratories, Inc., New York, who is also president of the Technology Alumni Association. The speakers will be Alfred H. Morton, vice-president of the National Broadcasting Co., and James H. Furay, vice-president of the United Press Associations.

Mr. Morton's theme will be the human and technical facilities used by the broadcasting industry in bringing news and opinion from all parts of the world, as well as the latest developments in television. Before 1939 he was in charge of operations of all the National Broadcasting Co.'s stations; as European manager of the Radio Corp. of America he had previously supervised the construction of broadcasting stations in Rome and Milan.

Mr. Furay, who was general manager of the foreign staff of the United Press during the first World War, will speak in a similar vein on the part played by the press associations in the gathering and distribution of news and its effect on public opinion. The general chairman of the day will be Francis A. Barrett of the New England Telephone & Telegraph Co.

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General Telephone Corp.'s April Station Gain

General Telephone Corp., New York, reports for its subsidiaries a gain of 3,367 company-owned telephones for the month of April as compared with a gain of 3,034 telephones for the month of April, 1939. The gain for the first four months of 1940 totals 11,553 or 2.30 per cent as compared with a gain of 8,214 telephones or 1.79 per cent for the corresponding period of 1939.

The subsidiaries now have in operation 513,137 company-owned telephones.

A Quick, Easy Way to Determine Heights

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HITEMETER

Now — quickly determine heights of poles, trees, road clearances, etc., with a Seelye Hitemeter. . . . Just pace off 75 feet from the base of the object to be measured . . . then place base of Hitemeter against bridge of nose, holding Hitemeter with thumb and first two fingers. Site along base of instrument to base of object — hold position — then site top of object and mark point on vertical scale. . . . Scale shows object's height. You or anyone else can quickly "shoot" heights of poles, trees, road clearances, etc.— efficiently with a Seelye Hitemeter. One trial proves it.

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Commission and Court Activities

FCC Approves Band for Frequency Modulation

Declaring that frequency modulation on a commercial basis is now desirable in the public interest, the Federal Communications Commission announced May 19 that the frequency band of 42,000 to 50,000 kilocycles would be available for that purpose. This will provide 40 channels, each 200 kilocycles wide—35 channels to regular high-frequency broadcast stations and five to non-commercial educational broadcast stations.

The commission hailed frequency modulation as "one of the most significant" contributions to radio in recent years. "It is ready to move forward on a broad scale and on a full commercial basis. On this point there is complete agreement among the engineers of both the manufacturing and the broadcasting industries."

It is not believed that the new FM service will supplant present broadcast stations or make obsolete the receivers now in use for a number of years. Testimony at its hearings on the subject, says the commission, indicated that in time manufacturers will provide receiving sets capable of receiving both services.

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New Member Appointed to Illinois Commission

Robert M. Harper, East Moline, Ill., newspaper publisher and former state senator, on May 14 took over his duties as a member of the Illinois Commerce Commission. He was appointed to the commission by Governor Horner to succeed the late Andrew Olson of Moline.

Mr. Harper represented the 33rd district in the Illinois senate from 1934 to 1938 and since then has been a member of the board of review of the division of unemployment compensation.

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Inconsistent Regional Toll Telephone Rates Cited

Inconsistencies of interstate telephone rates in the southeastern states and in New York and New Jersey were on May 14, by direction of the Federal Communications Commission, called to the attention of the Southern Bell Telephone & Telegraph Co., the New York Telephone Co., and the New Jersey Bell Telephone Co. with request that consideration be given to revising their respective schedules.

It was stated that the interstate toll rates of the Southern Bell, which serves Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and part of Kentucky, are generally higher than rates of the American Telephone & Telegraph Co. The difference ranges from five cents for station-to-station day rates at a distance of 50 miles, to 60 cents at a distance of 750 miles.

Tariffs of the New York and New Jersey companies indicate that message-toll telephone service between certain points in those states is rendered under a rate schedule that is generally higher for distances of less than 40 miles than the schedule applied by most of the other Bell companies.

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Pennsylvania Bell Bars Telephone for Racing News

The Bell Telephone Co. of Pennsylvania on May 2 declared it would cut off wire service to any of its subscribers who use telephones and teletype machines for the dissemination of racing news.

"We are doing everything within our power to get out of the horse-racing wire business," William H. Lamb, general counsel for the company, asserted at a hearing before the Pennsylvania Public Utility Commission. The hearing was on the petition of Abraham Plotnick to compel the company to give him wire service for the purpose of dispensing racing information.

The company conducted an investigation of Mr. Plotnick's business after he applied for service. Direct wires to his offices were denied after it was found they were to be used for collecting and distributing racing data.

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Commission Denied Intervention in Hotel Rate Case

Supreme Court Justice John E. McGeehan on May 14 denied a petition filed by the New York Public Service Commission for leave to intervene in a suit seeking to test the validity of its order prohibiting hotels from charging more than the regular telephone tariffs for patrons using their lines.

The suit has been brought by the

New York Telephone Co. against the Bowman-Biltmore Hotels Corp., operator of the Hotel Commodore in New York City. The court held that the commission had other means of enforcing its order without appearing in the action.

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Rate Increases Approved for New Richland, Minn.

The Central Electric & Telephone Co. was granted authority on May 2 by the Minnesota Railroad & Warehouse Commission to increase rates at its New Richland exchange. The approval was granted after the company had amended its original petition, at the commission's suggestion, by changing the proposed rate for rural, multi-party line stations to $1.65 per month. Originally the company had proposed to increase the rate from $1.50 to $1.75.

The rates to become effective June 1, are: One-party business, $3.00; business extensions, 75 cents; one-party residence, $2.00; four-party residence, $1.75; residence extension, 50 cents; rural multi-party, to remain at $1.50 until January 1, 1941, when it will be increased to $1.65; desksets, within base-rate area, no extra charge; rural desksets, extra charge of 25 cents per month, and handsets, extra charge of 25 cents per month for two years.

The Central Electric company serves approximately 190 local and 290 rural stations from its New Richland exchange. Fair value of the telephone property was placed at more than $30,000. Average yearly operating revenues of the exchange for the five-year period 1935-1939, were $10,247; total operating expenses averaged $8,806 and net income available for return on investment averaged $1,441 per year.

Under the new rates net income will amount to $1,785, annually; operating revenues will be $12,009 and operating expenses will be $10,224.

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Bell Files Rate Increases for Ten Oklahoma Exchanges

Schedules for increased rates in ten cities and towns of Oklahoma, effective with the next billings, were filed with the Oklahoma Corporation Commission May 10 by the Southwestern Bell Telephone Co., under protection of the recent three-judge federal court temporary injunction order. The exchanges affected are in Tulsa, Clinton, Okemah, Weatherford, Hartshorne, Walters, Bristow, Perry, Anadarko and Pauls Valley.

The Oklahoma commission, in its order of February 21, authorized certain increases in the foregoing cities with the exception of Tulsa and ordered decreases in 33 other cities and towns for a net annual reduction of about $50,000. However, the federal court enjoined the commission from enforcing the provisions of its order decreasing rates in the 33 towns and also enjoined the commission from interfering with rate increases in nine of the cities pending outcome of the Bell company appeal to the Oklahoma Supreme Court.

The Tulsa increases were not authorized in the commission order. The federal court, however, interpreted the statewide grouping provisions of the commission's order to automatically permit an increase of rates without a hearing when the number of telephones of a town increases so as to place it in a higher group classification.

The company, therefore, brought the rates in Tulsa up to the level of Oklahoma City, making them: Individual line residence, $3.10, increased from $2.85; one-party business, $7.25, increased from $7.00; four-party residence, $2.10, increased from $1.85. The two-party residence figure remains $2.35.

In Walters, Hartshorne and Clinton, the one-party residence rate was increased from $1.50 to $1.75 and one-party business from $2.50 to $3.00. In Okemah the one-party residence rate was increased from $1.67 to $1.75 and one-party business from $3.00 to $3.50. In Weatherford the one-party residence rate was increased from 50 cents to $1.75 and one-party business from $2.50 to $3.00.

Rate increases of 50 cents per month are made on one-party business telephones in Bristow, Perry, Anadarko and Pauls Valley.

The state commission in its order, classified telephone exchanges of the Southwestern Bell Telephone Co. into eight groups with the same rates for each exchange in a single group. The commission made no specific provision for automatic rate increases, without a hearing, when an exchange qualifies for a higher rate group by an increase in number of telephones.

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Bond Issue Approved for Western Light & Telephone Co.

The Missouri Public Service Commission on May 13 authorized the Western Light & Telephone Co. to issue $1,250,000 in first mortgage and collateral bonds in a refinancing operation estimated to save the company $5,000 a year interest payments.

The issue, bearing 3¾ per cent interest, will be used to retire $1,074,075

Northern White Cedar POLES for Telephone Line Construction and Maintenance

Large stocks in all popular sizes and lengths, graded to N.W.C.A., the N.E.L.A., the A.T. & T. and the A.S.A. specifications, are available for immediate shipment from Bell's Minnesota Transfer, Minn. yards and treating plants. With a background of more than half a century in producing, manufacturing and shipping Northern White Cedar Poles to telephone companies throughout the country the Bell organization has become known for its leadership in Service, Pole Quality and Butt-Treating efficiency. You, too, can experience the same satisfaction scores of Northern White Cedar pole users have if you turn to the use of Bell Poles. Write for a copy of the Bell Cedar Pole Data Book—it is yours for the asking.

Among many reasons the Northern White Cedar Pole is the safest, most economical and advantageous for telephone line construction perhaps the most outstanding are its—

Long Service Life, as proven by more than a half century record of use.

Natural Resistance to Decay.

Secure Anchorage because of natural large butt circumference in proportion to its length.

Light Weight, and subsequent low cost of installation.

While we recommend the use of poles butt-treated by Bell's Fibre-Spreading Pentrate Process to a guaranteed depth of penetration, we also furnish them untreated, if desired, or butt-treated to the "AA" or "B" specification—also roofed and gained as required.

We also furnish any size and length Western Red Cedar Poles if you prefer to use that specie.

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Certain wives in every small-town community served by magneto exchanges take exceptional pride in the furnishings of their homes. They know, and want, harmony in their household appointments.

The Suttlephone will meet with their approval. Cabinet is only 6½ x 10¼ x 4¼ inches in size. Total weight ten pounds. Beautiful natural finish, or colors if desired at no extra charge. Six-foot connection cord permits movement of location in room. Rubber mountings on base. Cost you only $18.25.

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SUTTLE EQUIPMENT CO.
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in bonds bearing 5 per cent interest. It will be sold to the John Hancock Mutual Life Insurance Co. of Boston, Mass., at 102½ with a maturity date of 1965.

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Summary of Commission Rulings and Hearings

Federal Communications Commission

May 14: Claiming inconsistencies of interstate telephone rates in the southeastern states and in New York and New Jersey the commission requested the Southern Bell Telephone & Telegraph Co., the New York Telephone Co. and the New Jersey Bell Telephone Co. to give consideration to revising their respective schedules.

Arkansas Department of Public Utilities

April 27: The Public Utilities Co. of Crossett filed application for permission to increase its rates an average of 38 cents for each private telephone. It asked authority to raise the private residential rate from $1.80 a month to $2, and private business from $2.70 to $3.25.

The company said installation of a common battery switchboard, costing $19,329, to replace a magneto board, made the higher rates necessary.

Illinois Commerce Commission

May 12: The commission suspended until September 27, the rate increases proposed by the Illinois Commercial Telephone Co. for Carlock and Piper City. The suspension will enable the commission to study the reasonableness of the suggested increases.

May 20: Hearing in Springfield on commission's citation of Chesterfield-Medora Telephone Co. for failure to comply with General Order 107 establishing standards of service for telephone utilities and General Order 115, rules for overhead line construction.

May 21: Hearings in Springfield on applications of Illinois Commercial Telephone Co. for authority to increase rates in Bement, Monticello and Deland.

May 22: Hearing in Springfield on application of Illinois Commercial Telephone Co. for authority to increase rates in Lawrenceville.

Kansas Corporation Commission

May 27: Hearing on complaint of the Central Kansas Telephone Co., Inc., against the Katy Telephone Co. of Elsmore. The complaint claims the Katy company invaded the exchange territory of the Central Kansas company's exchange at Moran.

May 27: Hearing on application of Central Kansas Telephone Co., Inc., for authority to make changes in rates in Westphalia.

May 28: Hearing on application of Central Kansas Telephone Co., Inc., for authority to make changes in rates in Harris.

June 3: Hearing on application of Kansas State Telephone Co. for authority to make rate changes in Baxter Springs.

June 4: Hearing on application of Central Kansas Telephone Co., Inc., for authority to make rate changes in Whitewater.

June 10: Hearing on application of Central Kansas Telephone Co., Inc., for authority to make rate changes in Kechi.

Massachusetts Department of Public Utilities

May 1: The commission continued without date the hearings on the petition for an investigation of the foreign exchange rates of the New England Telephone & Telegraph Co. It held a conference with company officials, among them George R. Grant, general counsel of the company, regarding the investigation started upon the commission's initiative as to intrastate toll rates charged. The question of procedure on the investigation was considered.

At a perfunctory hearing earlier exhibits were introduced showing that the total revenue from foreign exchange service amounts to approximately $14,000 and revenue from tolls without the state to about $1,000,000 a year.

Missouri Public Service Commission

May 10: Western Light & Telephone Co. authorized to file rate schedule for common battery service at Mountain Grove.

May 13: Approval given to application of Western Light & Telephone Co. asking authority for the issuance of bonds.

May 13: Joint application filed by Paul Holmes requesting authority to sell and P. F. Prater to purchase the Christian County Telephone Co., Ozark.

Nebraska State Railway Commission

May 17: Nebraska Continental Telephone Co. authorized to file rates and general tariffs covering operation at Madison.

New York Public Service Commission

May 3: The commission, in a three-to-one decision, upheld the proposal of the New York Telephone Co. to change the Richmond Hill 2 exchange to Virginia 7 and Virginia 9.

Commissioner George R. Van Namee was of the opinion that the same sentimental attachment prevailed for the old Greenpoint, Flatbush, Williamsburg, Harlem and Hunters Point exchanges, but they had to "give way in the interest of efficient and up-to-date telephone service."

May 22: Further hearing in New York on commission's investigation of rates and charges of New York Telephone Co.

Ohio Public Utilities Commission

May 13: Ohio Bell Telephone Co. authorized to revise its schedule in Maumee by adding free service to Whitehouse and Holland and revise its Whitehouse exchange tariff by adding Maumee and Holland as well as the Waterville exchange of the Citizens Telephone Co. The revisions become effective upon the inauguration of common battery dial service in Whitehouse at the following rates:

Business independent, $4; business two-party, $3.25; business rural, $3; residence independent, $2.75; residence four-party, $2, and residence rural, $2.

May 14: Northern Ohio Telephone Co. which has pending an application for authority to issue 6 per cent preferred stock to reimburse its treasury for uncapitalized capital expenditures as of April 30, 1939, submitted a sup-

(Concluded on page 58)

IN THE NATION'S CAPITAL

(Continued from page 23)

every dollar that Congress has diverted in the past from costly socialistic projects to the actual needs of our Army and Navy.

There are still those who insist that every national defense blueprint must include a provision for increasing public ownership and control of the electric power industry. There are still those who cry for "an adjournment of politics"—by the Republican opposition, of course—while at the same time agitating feverishly for a third term.

Let us hope that all this too will pass away. Let us hope that there will never come a day when an American general staff will have to point an accusing finger at Washington and say: "We asked for a planned defense and you gave us a blueprint of Utopia; we asked for guns and you gave us kilowatts."

FINALLY, there is the problem of paying for rearmament, which sooner or later is bound to affect operating as well as manufacturing branches of the telephone industry in their roles as taxpayers. President Roosevelt says there is simply the alternative of raising taxes or raising the debt limit. He overlooked or chose to ignore a third course of action — economizing on substantial outlays of federal funds for social programs of no pressing necessity. These funds could be plowed into the field of immediate armament production.

No thought has yet been given to the curtailment of many extravagant federal projects now under way or still in the blueprint stage. No suggestion has been forthcoming that federal subsidies to give the farmer a more abundant life (REA and other costly devices) might be suspended, at least during the present emergency.

Real defense experts insist that time is of the essence. This entire setup would seem to demand that Congress divert all available funds into avenues of national defense where they are urgently needed. We must be on the alert against such socialistic "Trojan horses" as public ownership control of the nation's public utility industries, including communications, being slipped in under the protective coloring and general excitement of getting America prepared.

Furthermore, no matter how fast things happen in Europe, we need balance and judgment in making progress towards an invincible America. We need government ability and disposition to treat the international situation realistically, as well as firmly. If we get too panicky and try to go too fast, there is a danger of going overboard in this matter. We need but recall the costly and fantastically futile NRA fiasco.

Certainly, it would be expensive—not to mention embarrassing—to get ourselves all loaded for bear and find that there was no bear within possible shooting distance. On the other hand, half-way measures could be even more tragically expensive. And after all, it is the second-best hand that costs the most in military conflict, as well as poker. The whole situation calls for the best judgment of the very best brains that our government and industry alike can provide—all working in a spirit of unstinting cooperation.

TO COME back to less sensational matters, the FCC on May 14 called to the attention of the Southern Bell Telephone & Telegraph Co. "inconsistencies" which it said existed in the interstate telephone rates in the southeastern states. The

COMING CONVENTIONS

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 28 and 29.

New York State Telephone Association, Hotel Syracuse, Syracuse, June 5 and 6.

North Dakota Telephone Association, Gardner Hotel, Fargo, June 12 and 13.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 19 and 20.

Oregon Independent Telephone Association and Washington Independent Telephone Association, Gorge Hotel, Hood River, Ore., Joint Meeting, June 28 and 29.

Michigan Independent Telephone Association, Hotel Olds, Lansing, July 24 and 25.

United States Independent Telephone Association, Hotel Stevens, Chicago, October 15, 16, 17 and 18.

Independent Pioneer Telephone Association, Hotel Stevens, Chicago, October 17.

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2. There's a Chance anchor for every job. Steel expanding. Wej-Lock malleable expanding. Never Creep malleable plates. Cone, Rock, and Screw anchors of all types. A complete range of sizes.
3. Chance Anchor Rods give you 1, 2, or 3 strand attachments. Thimbleye, Twineye, or Tripleye—threaded or Never Creep.
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company was asked to give consideration to revising its schedules.

The FCC said rates of the utility are generally higher than the rates of its parent company, the American Telephone & Telegraph Co. The differences, the FCC added, range from 5 cents for station-to-station day rates at a distance of 50 miles, to 60 cents at a distance of 750 miles. Southern Bell officials said they did not wish to make a statement until they had seen the complete FCC report, as the matter under discussion was highly complicated and technical.

Along a somewhat allied line, the brief of the Pacific Telephone & Telegraph Co., filed with the FCC on May 13, asked that the commission dismiss the complaint against its interstate toll rate schedules by the state of Washington, and to discontinue the commission's investigation of toll charges in other areas on the West Coast.

The telephone company's brief rejected the legality of the contention that the mere existence of two different toll rate schedules is sufficient to sustain a finding that one or the other is unlawful. The difference in this case refers to the differences between intrastate and interstate toll rates.

It may be that the FCC in attacking surface differences between toll rate levels of Bell System companies, is trying to follow the practice of the Interstate Commerce Commission. The ICC holds that discriminations within a carrier's rate structure may be removed without any probing into the reasonableness of the general rate structure.

In the case of the ICC this authority is buttressed by statute for the obvious purpose of insuring uniformity in railroad rates. For example, if a railroad wanted to charge more for a trip from New York to Cleveland than it did from New York to Chicago, the ICC would not allow it. Nor would it be a defense for the carrier to say that it still was not making enough money on its operations as a whole.

By coincidence, the Federal Power Commission has surprisingly employed this doctrine in the field of interstate electric power rates. In a recent decision (by a 3-to-2 vote) the FPC ordered the Otter Tail Power Co. to make available to eight wholesale customers (chiefly municipalities) the lowest of the prevailing schedules. The decision contains the doubtful proposition that as between two or more different rates charged for the same or similar services, the lowest rate should be regarded as "reasonable."

It is not clear that either the FCC or FPC versions of such railroad regulatory doctrine can be validly applied in the respective fields of telephone service or interstate power sales.

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RURAL TELEPHONE LINE PROTECTION

(Continued from page 25)

line, the proposal has been made to turn the substation protector around as in Fig. 3. This leaves the arrester blocks on the line where they may be expected to act like pole arresters. But what may be expected to operate the fuses?

Rural electrification forces the change to metallic circuit lines, in which case the interior wiring is insulated, also the telephone. If ground ringing is used, any current large enough to blow the fuse will "blow" the ringer windings long before. Anyway, how can such current strength exist under this condition?

In this connection, the arrangement of Fig. 4 has been proposed. The airgaps at the telephone end

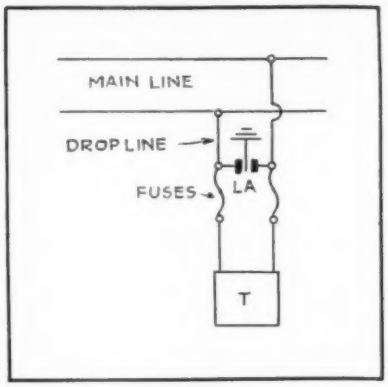


Fig. 3. Suggested arrangement of substation arrester to avoid high potentials on the telephone line.

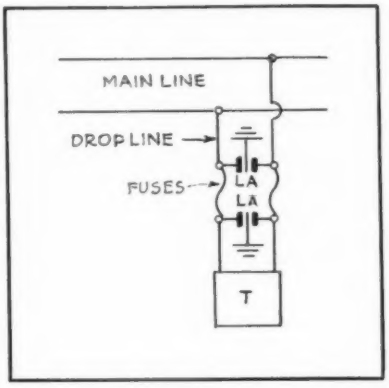


Fig. 4. Substation protector arrangement with air gaps on line side larger than on telephone side.

would be three mils or four mils, while those at the line end would be larger, perhaps the same as in pole arresters. This changes the discussion to the location of pole arresters which happen to be near to substations—should they be on the pole as part of the main line, or in the substation protector?

Another mode of protecting central office cable has been proposed and to some extent put into use. This consists in omitting fuses at the end of the cable which is connected to open-wire line and splicing into the cable a short piece of cable whose wires are very much smaller than those of the regular cable. The idea is to reduce outage which sometimes occurs due to the blowing of fuses in the cable box. It is expected that if the current is too strong, the fine wires will melt and act as fuses to save the rest of the cable.

The labor and cost of replacing the fine wire cable is regarded as of little consequence. But it must be observed that the current which is

strong enough to melt the fine wires must get to earth somewhere. That somewhere is most naturally the main distributing frame. It is believed by many that this is not as good a plan as to use fuses in the cable box, with a pole arrester on the first or second pole of the open-wire line.

It is a good thing, as soon as it can be done, to recognize guiding principles. Absence of clearly-defined principles tends to keep one's reasoning and methods a little haphazard. To stimulate thought about this matter, the following statements are proposed as principles which should guide telephone engineers in arranging means to reduce or prevent power lines from getting crossed with telephone lines and other means for protecting persons and property when a cross *does* occur:

(1) No injury should occur to any user of a telephone, even if he is conductively connected to the earth and is touching or grasping any exposed part of the telephone.

(2) Just as far as it is reasonably possible to accomplish, no injury should occur to any telephone employe when he is touching telephone conductors in such a way as is necessary in the conduct of his work.

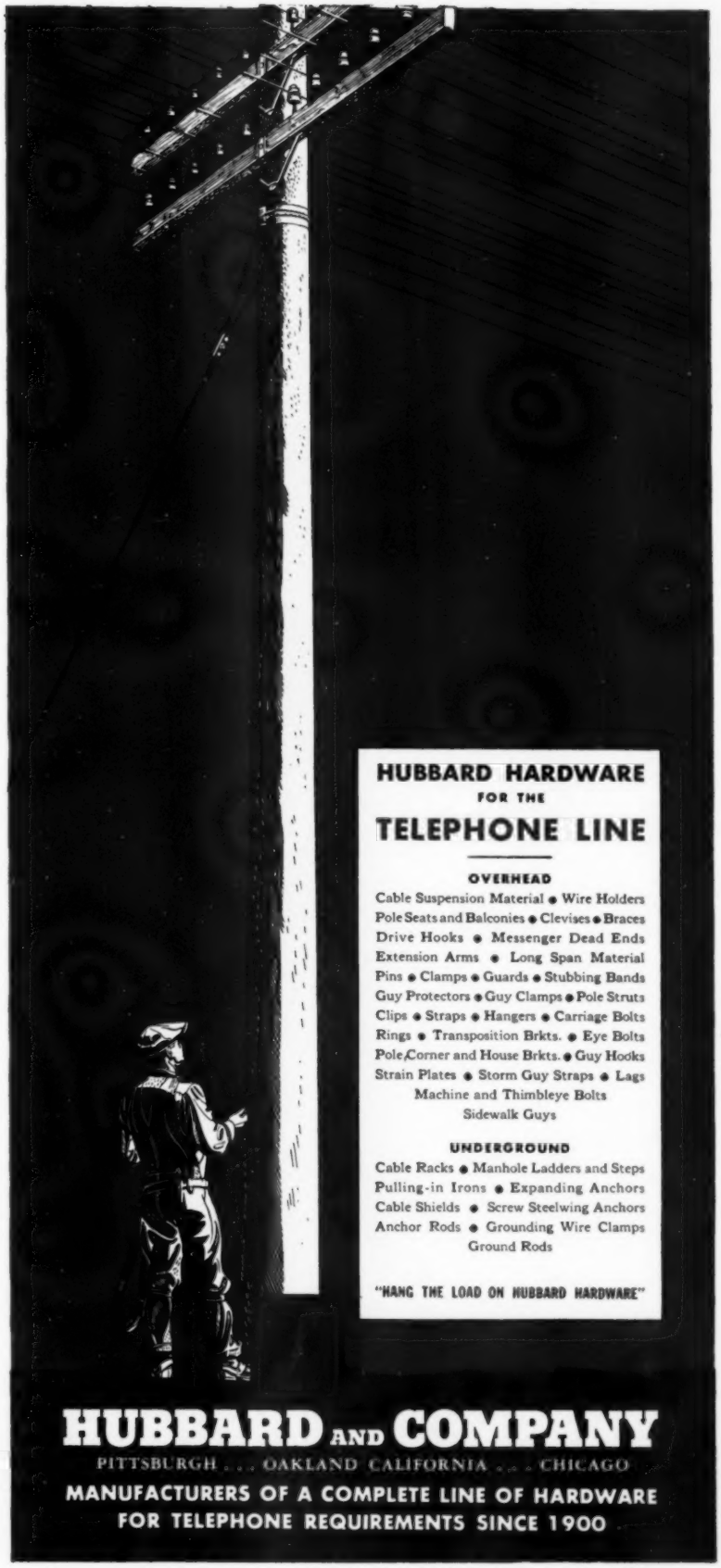
(3) Equal attention should be paid to preventing power crosses and to protecting persons and property when a cross occurs.

Briefly, the factors which must be considered are: Injury to people; injury to property; outage of facilities; cost of investment and of maintenance; and conformity to moral and legal requirements.

It is hoped that the matters presented in this short discussion will stimulate Independent telephone engineers to work out a system of protection which is sufficiently comprehensive and well founded on basic principles for all to adopt. If this happens, both our industry and the telephone-using public will be materially benefited.

Dates Set for National Independent Convention

The 1940 convention of the United States Independent Telephone Association will be held at Hotel Stevens, Chicago, October 15, 16, 17 and 18, according to a recent announcement by Louis Pitcher, executive vice-president. The Independent Pioneer Telephone Association will meet during the national convention and its committee will be in charge of the banquet and entertainment for Thursday, October 17.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SUMMARY OF COMMISSION RULINGS AND HEARINGS

(Concluded from page 54)

plemental application asking a preliminary order at this time authorizing the issue and sale at $102.50 or $123,650 of 5 per cent preferred stock to provide for the partial reimbursement of its treasury for such expenditures.

The commission, denying the application as formerly filed, authorized the issue and sale of 5 per cent preferred stock as asked upon the condition that the proceeds be used to the extent of the par value of the stock for the reimbursement of the company's depreciation reserve fund and the premium paid into capital stock premiums account.

May 14: Ohio Bell Telephone Co. authorized to file a new schedule incorporating Lockbourne into and as a part of Groveport under the new tariff of Groveport, which provides:

Unlimited business independent, $11; residence independent, $4; residence two-party $3.25;; residence four-party $2.75; rural business $4.50; rural residence $2.75, and limited business independent entitled to 90 messages at $5.50 and additional messages at 4 cents each, and to have free service to Columbus, Canal Winchester and Reynoldsburg exchanges.

The new rates are to become effective after necessary facilities are available.

May 15: Licking Rural Electrification Co. directed to relocate certain of its electrification circuits, said to conflict and interfere with lines of the Ohio Central Telephone Corp. in Harrison township, Licking county.

It was held by the commission that construction of the circuits was in conflict with its order No. 72.

The matter was brought before the commission recently in a joint submission of the situation by the two companies.

Oklahoma Corporation Commission

May 28: Hearing in Davidson, by Referee Paul R. Reed, on investigation of adequacy of service of the Southwest Telephone Co. at Davidson.

West Virginia Public Service Commission

May 1: Chesapeake & Potomac Telephone Co. of West Virginia authorized to extend its service to 44 subscribers in Eldora, Saltwell and Kilarm.

Twenty-two telephones at Eldora will be serviced from the Fairmont exchange and the other 22, at Saltwell and Kilarm, from Shinnston.

Permission was given after the Boothsville Telephone Co. said it had no objections to the extensions because it was "not financially able to improve or extend its service as requested by the parties."

Wisconsin Public Service Commission

May 29: Hearing in Madison on application of Wind Lake Telephone Co., Racine county, for authority to revise its rates and rules.

June 5: Hearing in Madison on application Rural Badger Telephone Co. for authority to sell its property and of Cuba City Telephone Co. to purchase and apply its rates.

PREVENTIVE MAINTENANCE

(Continued from page 21)

three spans of rusty sections of wire must be replaced to make a line all good. Great improvement has been made during the past few years in line wire for telephone purposes, and any company will do well to investigate its numerous possibilities. The transmission qualities of some of these new wires are far superior to the old style variety.

Now that so many rural electric power lines are run through the rural districts it is most necessary that telephone lines be both transposed and insulated properly. Grounded telephone lines cannot be transposed. When the conductors of a metallic circuit telephone line are run parallel to a power line and within its magnetic field, a small current will naturally be induced in the telephone line.

The two conductors of the telephone line occupy slightly different positions within this magnetic field, and because of this currents of different value will be induced in each separate conductor. If a conducting path is provided, this current will flow from one side of the line to the other or from both sides to ground. Due to the extremely low currents used in telephone work, these induced currents may seriously impair transmission.

A telephone line should first be well insulated and then transposed. This assists materially in balancing the induced currents in both sides of the line and prevents its flow from one side to the other through the telephone equipment. Good insulation prevents the current flow from the line to ground. In all ordinary cases, when the telephone line is properly transposed and insulated—if the parallel is not extra long and the two lines are not located too close together — satisfactory transmission will be provided.

In some extreme cases, the transpositions of the telephone line must be coordinated with similar transpositions in the power lines. Power companies will ordinarily be found ready and willing to render any assistance possible to help the telephone company clear its lines in the event that the power system is causing trouble on them.

So often a good well-built rural line is seen while the loops from it into the subscribers' stations are strung in a haphazard manner. In all such cases, a study will indicate that the majority of the trouble on the line is caused by the compara-

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tively short lengths used as subscribers' loops. Often this may be traced to the fact that these loops were strung slack and proper clearance was not provided. Naturally, trouble is the result.

When subscribers' loops are not over three spans in length they should be strung with insulated drop wire of either the parallel or twisted-pair type. This wire is easy to install and will give good service over a long period of time. Extra long drops—ten spans or longer—may be satisfactorily strung with open wire. In all such cases, it is recommended that the open wire be dead-ended on a suitably anchored pole within two or three spans of the house and drop wire extended from that point.

An approved substation protector should be installed at the telephone and a good ground connection made. A ground rod will usually be found best suited for this purpose. Inside runs should be of the approved house-wire type, held in place with insulated staples or milonite nails. Inferior inside wiring not only presents a bad appearance but may cause service interruptions and result in many expensive trouble trips.

All connections in the wiring at subscribers' stations should be carefully made, for loose connections are frequently the cause of noise and cutout trouble. Splices of inside wire should be made with either the compression type sleeves or twisted connections, well-soldered and taped.

Dry cell batteries are so good these days that there is no need of their causing trouble on telephone lines if they are replaced at proper intervals. Normally, all dry cells can be changed at regular intervals to prevent them from dropping below the point where they will provide proper current flow through the transmitters.

It is true that some telephones on a line are not used as much as others and will last slightly longer than those used with greater frequency. However, it is generally considered much better to throw away a few cells, which have some life left in them, than to use others beyond the time when they will not give good, reliable service and commercial transmission.

Ordinarily, a telephone company should make a field test to determine how long the dry cells in its telephones will last and provide a satisfactory grade of service. This period may be one year, 18 months, or even longer with some types of dry cells. After this period has been determined, a regular routine replacement plan may be arranged.

XUM

When the time period on a certain line has expired, all cells may be replaced on a single trip. This practice will permit considerable saving in the prevention of frequent trouble trips to replace the cells, one station at a time.

Proper Attention to Trouble Reports

There is an old saying that the only telephone man who failed to gain admission to the pearly gates and was consigned to the nether regions was one who took a report of trouble from a subscriber and then failed to take necessary action. This may be going a bit strong, but there is no doubt that the one thing which will contribute most to the success of any telephone system is the paying of strict and proper attention to all reports of trouble.

This applies equally to reports from subscribers and those made by operators or other employes of the telephone company. When a subscriber experiences trouble, he naturally does not expect his request for relief to be ignored. Making tests on such reports and pronouncing the trouble O.K. is a practice which should always be discouraged.

There will naturally be cases when some condition on a connection caused trouble that cannot be associated with the particular line or subscriber's station equipment. In all such cases, the nature of the trouble can generally be explained over the telephone to the subscriber in order to avoid a trouble trip. It is also a good practice to advise this subscriber that, in the event the trouble is experienced later, he will be doing the telephone company a favor by reporting it immediately.

It is always a good plan to maintain an accurate record of all trouble reported on a telephone system and the manner in which it was cleared. An analysis of such trouble records may be made from time to time which may indicate a certain weakness in the plant that can be corrected in a manner so as to react to the advantage of both the telephone company and its subscribers.

It is not intended that the ten points as herein outlined shall cover all maintenance requirements in every telephone exchange. It is believed, however, that many of the items suggested can be used and others can be modified to meet local conditions. There is no doubt that preventive maintenance, which actually amounts to the clearing of trouble before it happens, can be used to advantage on any rural community telephone system.

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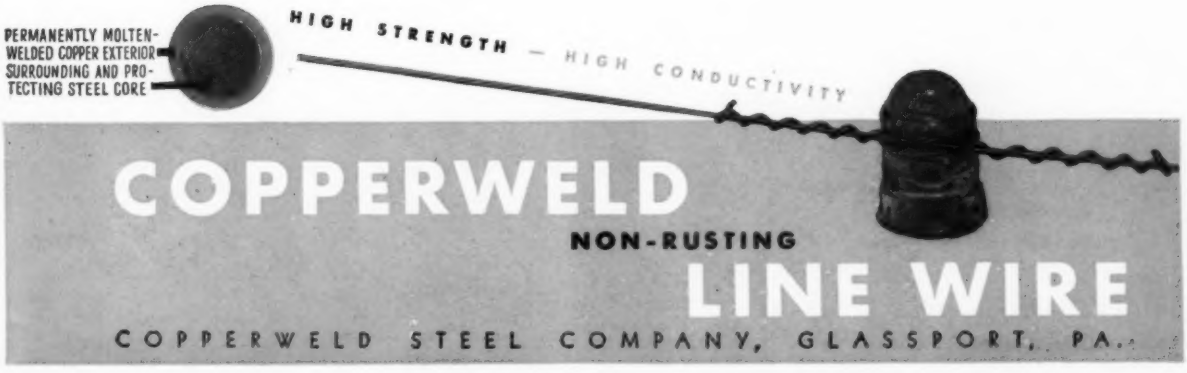
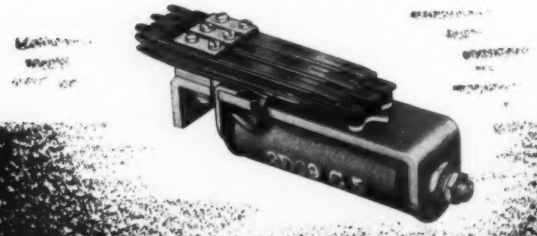
The high strength of Copperweld non-rusting line wire makes it ideal for modern long span construction. The thick copper exterior permanently molten welded to the tough steel core provides permanently better conductivity and permanently better voice transmission. Copperweld offers twice the conductivity of BB iron wire!



GREAT DISCOVERIES

Ability to arrange known elements in new combinations designed to improve performance has fathered many of the world's great discoveries.

Sturdy telephone relays arranged in simple circuit combinations produce the North "All-Relay" System with its unsurpassed records of maintenance-free operation.

THE NORTH ELECTRIC MFG. CO.
Galion, Ohio